Project related finance for construction contractors operating in the United Arab Emirates

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PROJECT RELATED FINANCE
FOR CONSTRUCTION CONTRACTORS OPERATING
IN THE UNITED ARAB EMIRATES

by
Hani Hashem Shawa, M.Sc., MCIOB

A DOCTORAL THESIS

Submitted in partial fulfilment of the requirements for the award of
Doctor of Philosophy of the Loughborough University of Technology

1995

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Hani Shawa
DEFINITIONS

Advance payment guarantee: A bond issued by the bank to cover the advance payment of a certain sum of money, under the Contract, by the Employer to the Contractor to permit the latter to cover mobilisation costs necessary to proceed with the execution of the contract.

Back-end loading: A practice employed by estimators whereby the rates for work to be executed towards the end of the contract are increased to generate more income near completion.

Bills of Quantities (BoQ): Itemised lists setting out the quantity of the work to be done for the promoter so that the contractors can insert their rates for each item as instructed.

Bond: A guarantee issued by a financial institution on behalf of the contractor to recompense the promoter for a specified fault by the contractor under the terms and conditions of the contract.

Breach of contract: Failure to comply with any term of contract.

Contract: An agreement enforceable by law. It consists of the completed form of tender and form of agreement together with the written acceptance, conditions of contract, specification, drawings, and priced bill of quantities.

Contractor: Constructor of the works on site and named in the contract.

Consultant: Adviser
**Dayworks:** Construction work done by a contractor to be paid for on hourly rates basis.

**Debtor:** One who owes the business money.

**Defects liability period** (also known as the maintenance period): the period stated in the Appendix to the Form of Tender calculated from the date of completion of the works, certified by the Engineer, or from the respective dates so certified in the event of more than one certificate.

**Engineer:** Known as “the Engineer”. A named individual who has the expertise, knowledge of a contract, powers and duties to instruct and supervise a contractor for the construction of the works without being a party to the contract.

**Employer:** The owner of the construction project and first party to the contract; also known as the Promoter.

**Estimate:** The prediction of the cost of a project to the contractor.

**Equipment:** See plant

**Front-end loading:** A practice employed by estimators whereby the rates for work to be executed at the beginning of the contract are increased to generate more income at an early stage of the contract.

**Gearing:** The total of borrowings as a proportion of the total of capital and reserves.

**Guarantee:** An undertaking by a third party to recompense a party for a specified fault by the other party. Also see bond.

**Letter of intent:** A means of informing a tenderer of the intention to enter into a contract with him.
**Letter of Credit (L/C):** A written commitment on the issuing bank's part to put an agreed sum of money at the disposal of the seller on behalf of the buyer (opener) under precisely defined conditions.

**Leverage:** See gearing.

**Liquidated damages:** The payment or forfeiture provided for in a contract where there is a breach of contract.

**Net worth:** The total of fixed assets and working capital less long term liabilities.

**Nominated sub-contractor:** Any specialists, merchants, tradesmen or others ordered by the Engineer or the Promoter for the execution of any work or the supply of any materials or services.

**Plant:** Machinery owned or hired by the contractor to carry out the works.

**Preliminaries:** Expenses associated with site facilities to be paid for by the Employer to the contractor soon after incurring them.

**Pre-qualification:** Selection of contractors before inviting them to tender.

**Promoter:** See Employer.

**Provisional sum:** A sum of money set aside in the contract for an item of work to be carried out by the contractor when defined at an agreed price during the contract period.

**Remeasurement:** Also known as admeasurement. Calculation of the actual quantities of work completed under a BoQ contract.
Retention money: A specified percentage to be deducted from the contractor’s payments and kept until the end of the defects liability period which is usually 12 months after the taking over of the works.

Schedules of rates: Itemised lists of work to be performed for tenderers to price per unit quantity.

Sub-contractor: A contractor employed by the main contractor and has no contractual obligations to the Employer.

Sub-letting: Employment of a sub-contractor by the main contractor to carry out part of the works.

Substantial completion: When the essentials necessary for the full accomplishment of the purpose of contract have been completed.

Tender: The price submitted by the contractor to the employer as an offer to enter into contract.

Valuation: The process of calculating the amount of payment due under a contract.

Variation: A change ordered by the Engineer.

Working capital: The continually changing business assets, less liabilities, which are used in the day-to-day running of the business.

Works: Known as “the Works”. All work to be carried out by the contractor including all materials and services that must be supplied in accordance with the terms of the contract.
ABBREVIATIONS

A.P.G.: Advance Payment Guarantee
BOT: Build-Operate-Transfer
DH: UAE currency (Dirham)
FD: Fixed Deposit
L/C: Letter of credit
LPO: Local Purchase Order
OD(PPC): Overdraft (Progress payment discounting)
OD: Overdraft
PB: Performance Bond
PRF: Project Related Finance
PPC: Progress Payment Certificate
RG: Retention Guarantee
ROI: Return On Investment
S+U: Sight plus usance
TR: Trust Receipt
UAE: United Arab Emirates
ABSTRACT

Demand for construction Project Finance has developed in recent years as construction projects have become more elaborate requiring more expensive and specialised technologies for their execution.

Contractors' involvement with banks when operating in the United Arab Emirates usually starts at the bidding stage with the issue of bid bonds. This develops into larger commitments following their request for performance bonds and finance facilities when they are awarded the contracts.

The aim of this research is to investigate lending banks' assessments of contractors operating in the UAE, and the latter's financial requirements in order to execute various construction projects. It further aims to reconcile the needs of the construction contractor to those of the lending banks and arrive at an acceptable level of risk sharing and reward.

A method of research has been adopted which includes a literature review, interviews with selected bankers and contractors, the development of case studies, and a field survey by means of questionnaires sent to both borrowers and lenders. Data relating to twenty-eight construction projects that used Project Related Finance for their execution was analysed to see if there was common ground for adoption of Project Related Finance strategy.

The questionnaire survey also revealed that while bankers extend both Corporate Finance to construction companies as general limits, and Project Related Finance as limits specific to the project concerned, 73 per cent of contractors that participated in the survey used the latter. The issue of risk management in contracting and the
acceptability of risk by contractors as compared to that by bankers are discussed in
detail.

The results of this research indicate that an evaluation of both the construction project
and the contractor could yield a method to assess the feasibility of adopting a finance
strategy on a project-by-project basis. This method is to be referred to as Project
Related Finance. The research then concentrates on the needs of borrowers and the
requirements of lenders when they resort to Project Related Finance in construction.

The research revealed that, on the whole, bankers consider the financing of
construction contractors as an important constituent of their portfolios. It has also
been shown that there is a working relationship between bankers and contractors in
the executing of construction projects. The relationship lasts throughout the duration
of the contract and carries on until the end of the defects liability period.
CHAPTER ONE

INTRODUCTION
CHAPTER 1 INTRODUCTION

1.1 Background to the research

Project Finance has become an important constituent in the portfolios of many national and international banks. Since Project Finance means the repayment of the loan from the project’s income, it involves little or no dependence on the balance sheet of the borrower. Both lenders and investors look at the economics of the project itself and its associated contractual agreements for security rather than the general credit of the promoters.

Project Related Finance for construction, although important, is less well known. It is a method of financing the construction contractor to execute the project by means of agreed facilities linked purely to the project’s own planned cash flow. This form of borrowing is becoming popular in the construction industry both internationally and, more evidently, in the developing countries of the Middle East. Project Related Finance is looked upon as an innovative new feature of banking techniques where an equity risk is taken without equity participation. Lenders, however, resort to various methods to protect their interests from the risks to which the borrower and, in some instances, the host country exposes them. A great deal of these methods are centred around the credit-worthiness and technical capability of the construction contractor, and progress reporting on the performance of the construction project itself.

Since Project Related Finance repayments are dependent upon the contractor’s capacity to perform, and upon the construction projects generating the necessary income, lending banks have consequently become more involved in the mechanics of construction. They are compelled to employ the appropriate technology and resources which enable them to evaluate the prospective borrower before committing themselves. More importantly, it enables them to review critically the progress of the construction project.
The borrower, on the other hand, will want the lending bank's full commitment to provide the necessary facilities at the least cost.

1.2 The objectives of the research

The author's interest in the financial aspects of construction projects from a contractor's point of view was the main force behind this research. This interest has intensified over the years as the author saw for himself both the positive and negative effects of finance on construction projects while working in the UK and the developing countries of the Middle East.

It can be beneficial for a contractor to employ a certain strategy when pricing a tender by front-or end-loading it as the case may be. Twelve out of twenty contractors confirmed in the interviews that they practised front-or end-loading the tender in anticipation of possible financial gains. A contracting company could have excellent reasons for increasing its rates on certain items that could only be executed towards the end of the contract. They may have obtained reliable information that those items would be largely increased in numbers. The problem that faces them, however, is whether they could survive the self-inflicted tight cash flow till the end of the contract to reap the benefits. A Project Related Finance package could be structured to accommodate such situations.

The need to understand fully the problems that face construction contractors when organising suitable finance packages for the execution of their projects provided a personal challenge in doing the research.

Project Related Finance involves two inseparable objectives. The first concerns the legal or physical independence of the project in order to relate the credit to the project cash flow. The second relates to the formation of a safety net as a safeguard against default in the event of the project not producing the projected cash flow. Failure to achieve these two objectives simultaneously will imply that the project lenders take substantial equity risk. According to Wood (1980, p.313): "Project loans involve a
degree of equity risk in the sense that they rely on the project for their pay-out and not on the general credit of the borrower".

The main objectives of the research are to investigate the contractor’s choices and decision criteria when considering a Project Related Finance package, and the decision criteria of the lending bank for granting the required facility. To achieve these objectives, it was necessary to undertake the following.

- A research assessment of bank finance for construction contractors, the methods used in practice and an extensive literature review.
- The formation of research hypotheses and definition criteria about Project Related Finance and testing them by means of questionnaires, interviews and case studies.
- The investigation of contractor’s choices of finance, their degree of preference for Project Related Finance and the lending banks reaction to it.
- To provide an insight in the practical world of Contractor’s management of tenders through the cost estimate and the handling of their finances after award and during construction.
- To examine the financial cycle of different construction projects and see its influence on their progress.
- To develop guidelines for lenders and borrowers to adopt when considering Project Related Finance facilities for construction contracts.

The orientation of the research is therefore that of finance relevant to construction.

1.3 Research locality

Before presenting the research it is important to describe its locality and environment. Although financing construction contractors can be investigated in any part of the world, it was decided that the Arabian Gulf Area generally, and the United Arab Emirates in particular, would be a suitable location for the following two reasons.
The UAE have sustained high levels of construction activities since the early 1970's through federal government spending on infrastructure and development projects, and private sector spending on general building projects. This necessitated the setting up of large numbers of national and multi-national construction organisations to execute these projects. These companies were targeted to participate in the research.

The UAE has the largest number of banks operating in the Gulf. There are a total of forty seven locally incorporated and foreign banks operating in the UAE set up to serve trade since Dubai has established itself as the trading centre of the region, as well as construction and other industries. The participation of as many banks operating in the region as possible was vital to the research.
1.3.1 The United Arab Emirates in brief

The UAE is a federation of seven Emirates; namely Abu-Dhabi, Dubai, Sharjah, Ajman, Umm Al Quwain, Fujairah, and Ras Al Khaimah. All these areas were under British protection since 1820 and were known as the Trucial States. They joined together to form the UAE which came into existence in 1971 and is a member state in the Gulf Co-operation Council. The rulers of the seven Emirates make up the Supreme Council and Federal Government. Abu Dhabi is the federal capital being the largest, most populous and richest in oil. Dubai although rich in oil is more known as a business and commercial centre.

The total land area of the UAE is 83,600 square kilometres with a population of 1.9 million. The Emirate of Abu Dhabi is 67,000 square kilometres of the total. The UAE is situated in the south-east of the Arabian Peninsula (Figure 1.1). It extends from the Sultanate of Oman in the east to Qatar in the west, and Saudi Arabia in the south. It lies along the southern coast of the Arab Gulf stretching for 700 kilometres. Its eastern coastline stretches for 90 kilometres along the Gulf of Oman.

Abu Dhabi is the country’s leading oil producer and its development drive is fuelled by oil revenues. Dubai is a relatively minor oil producer, but its economy has traditionally flourished through international and regional trading. Of the other emirates, collectively known as the northern emirates, only Sharjah produces oil in commercial quantities. It is also the second biggest gas producer in the UAE after Abu Dhabi, with an output of about 800 million cu. ft. per day (Trade & Industry, July-August 1994). One positive aspect of the union is the creation of a more viable economy with some transfer of wealth from the oil rich emirates to the northern emirates.

1.3.2 Oil and progress

Since the discovery of oil in Abu Dhabi in 1960, and especially during the last two decades, the UAE witnessed remarkable growth in its economic and social patterns.
These positive developments have played a significant role in placing the country as a leading commercial and industrial centre in the region. The major economic changes had a positive impact on the social development and in elevating the living standards of its citizens. Major social development projects were established by both the government and private sector. In 1971, for example, there were around 20,000 children attending schools in the big towns only. The free-schooling programme of the Federal Government now covers even the smallest desert settlements. This gave rise to an impressive increase in the number of school-going children which stands at present at around 360,000 and consequently to a massive school building programme. The decision to build a university was first made through federal law No (4) in 1976. The UAE University was officially opened on November 10, 1977 to meet the society’s need for higher education and scientific research. The university offers courses in Arts, Science, Education, Economics, Islamic Sharia’ & Law, Agricultural Sciences, Engineering and Medicine & Health Sciences. According to the UAEU Statistical Yearbook 1990/1991, eleven batches have so far graduated from the UAEU totalling 10,517. Table 1.1 below shows the total number of university graduates of both sexes between the years 1981/1991.

Table 1.1 Total number of university graduates between 1981 and 1991

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<td>803</td>
<td>843</td>
<td>1275</td>
<td>1202</td>
<td>1202</td>
<td>1289</td>
<td>1157</td>
<td>1176</td>
</tr>
</tbody>
</table>

The university also contributed to the establishment of a number of Higher Colleges of Technology to make available educational and vocational alternatives in line with students’ interests and society’s needs.

The Federal Government through the ministries of Health, Education and Public Works and Housing have embarked on a massive infra-structure building programme throughout the UAE. According to UAE Central Bank Annual Report for 1992,
Public Finance Development expenditure for 1992 increased to a total of Dh132 million (US $2,488 million). This represents spending on various construction projects, town planning schemes, building of low-cost houses, payments to contractors for completed projects and construction and maintenance of infrastructure projects. The municipalities of each individual emirate have also been making tremendous efforts in the development of their own areas. The private sector has also contributed to the general growth and well-being of the country. The ever increasing number of businesses in foreign trade, finance, manufacturing and the service sector stimulated the real estate market. A boom in construction especially in Abu Dhabi, Dubai and Sharjah got under way to accommodate the growing population. According to the UAE Central Bank Annual Report, 1992:

"The continued expansion in the construction and building sector was mainly attributed to the increase in population, rising demand for residential buildings, particularly after the demolition of several old buildings and the increasing demand for commercial buildings associated with the recovery of economic activities. The added value of this sector which constitutes 8.6 per cent of GDP rose by 6.6 per cent in 1992, compared to 1991, to reach a total of Dh11.1 billion".

The Emirates Industrial Bank, in its 1984 Annual Report discussing growth in construction, stated that:

"while construction employed 30-33 per cent of GDP during its peak in 1977 and 1979, unusually high ratios compared to most countries, it registered a sharp decrease during the recession of the mid-eighties".

The ratios subsequently recovered and fluctuated during the past ten years from 8.30 per cent to 10.11 per cent with a mean average of 9.08 per cent as can be seen from Table 1.2. However income from oil has played a major role in construction in the UAE. The relationship between oil income and construction is graphically illustrated in Figure 1.2.
Figure 1.2 UAE Construction versus Oil Income

![Bar chart showing construction expenditure and oil income from 1984 to 1993. The values are in billion Dirhams.](chart.png)

- **Construction Expenditure (Billion Dh.)**
- **Oil Income (Billion Dh.)**
Table 1.2 UAE Central Bank Statistics on Construction/GDP

<table>
<thead>
<tr>
<th>YEAR</th>
<th>GDP BILLION (DH)</th>
<th>OIL BILLION</th>
<th>CONSTRUCTION BILLION</th>
<th>CONST/GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>103.00</td>
<td>46.00</td>
<td>10.00</td>
<td>9.70</td>
</tr>
<tr>
<td>1985</td>
<td>102.14</td>
<td>44.70</td>
<td>8.88</td>
<td>8.69</td>
</tr>
<tr>
<td>1986</td>
<td>80.31</td>
<td>26.17</td>
<td>8.10</td>
<td>10.08</td>
</tr>
<tr>
<td>1987</td>
<td>88.65</td>
<td>32.20</td>
<td>7.98</td>
<td>9.00</td>
</tr>
<tr>
<td>1988</td>
<td>88.00</td>
<td>29.60</td>
<td>8.90</td>
<td>10.11</td>
</tr>
<tr>
<td>1989</td>
<td>101.80</td>
<td>38.80</td>
<td>9.2</td>
<td>9.03</td>
</tr>
<tr>
<td>1990</td>
<td>125.70</td>
<td>57.63</td>
<td>11.18</td>
<td>8.90</td>
</tr>
<tr>
<td>1991</td>
<td>125.40</td>
<td>53.70</td>
<td>10.41</td>
<td>8.30</td>
</tr>
<tr>
<td>1992</td>
<td>129.26</td>
<td>50.50</td>
<td>11.10</td>
<td>8.60</td>
</tr>
<tr>
<td>1993</td>
<td>131.60</td>
<td>51.35</td>
<td>11.12</td>
<td>8.45</td>
</tr>
</tbody>
</table>

1.3.3 Industrial progress

The sharp rise in the price of oil after the 1973 Arab oil embargo has helped the UAE in enhancing its gross domestic product (GDP) and its exports tremendously. However according to Emirates Industrial Bank Annual Report for the past five years, there seems to be a steady increase in the non-oil GDP as follows:

Table 1.3 Emirates Industrial Bank Statistics on Non-oil GDP

<table>
<thead>
<tr>
<th>YEAR</th>
<th>NON-OIL GDP DIRHAM (BILLION)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>63.1</td>
</tr>
<tr>
<td>1990</td>
<td>68.1</td>
</tr>
<tr>
<td>1991</td>
<td>71.7</td>
</tr>
<tr>
<td>1992</td>
<td>78.76</td>
</tr>
<tr>
<td>1993</td>
<td>80.25</td>
</tr>
</tbody>
</table>
Increased industrial activity and infrastructure investment coupled with a strong trade base have all contributed to the sharp rise in the country’s economy.

The introduction of free trade zones like Jebel Ali Free Zone, which is the largest in the Middle East, have added to the success and development of industry and trade. According to the latest statistics issued by the Jebel Ali Free Zone Authority (JAFZA), the number of companies attracted by JAFZA and set up business in the nine-year old zone up to February 1995 reached 750, representing 68 countries and employing around 33,000 employees. In addition to new companies, 17 existing investors, including Unilever, Phillips and Acer, leased additional land or buildings from the Free Zone Authority.

The Free Zone Decree by the Dubai Government helped foreign companies to operate without local partners and permitted 100 per cent foreign ownership. The Free Zone is less restrictive on the engagement of expatriate staff which has always been a major problem for foreign companies operating in the Gulf. With many incentives such as free movement of capital and profits, no currency restrictions or taxation, modern efficient communications, excellent supporting services, abundant energy, and an attractive working environment, the Free Zone concept has been a major success in the industrial growth of the UAE.

While before 1971 almost every commodity was imported from abroad, the country now exports about 25 per cent of its locally manufactured goods. The manufacture of construction materials is a thriving business in the UAE due to the buoyant market. The availability of abundant energy in the form of oil, gas and electricity and the excellent transport and communication networks have had a positive effect on industries. Sharjah, Ajman, Umm Al Quwain, Ras Al Khaimah and Fujairah - collectively described as the northern emirates as they are located north of Dubai - have established various industries. These range from manufacturing in Sharjah to quarrying in Ras Al Khaimah. They supply projects in the two bigger markets of Abu Dhabi and Dubai. This brings about a strong force of interdependence within the seven emirates of the UAE.
There are in the UAE nine Portland cement and one white cement factories, one aluminium smelter, two ceramics factories and three major pipe manufacturers. A large number of mosaic tile, concrete block and pre-cast concrete products manufacturers have been established to cope with increasing demand. The use of locally manufactured glass reinforced concrete and polyethylene products has increased tremendously and their quality compares favourably with international standards. There are many steel making industries that rely on steel imported in the form of rolls, ingots, structural sections, sheets and bars.

1.3.4 Climate

The UAE lies within the arid zone that stretches through Asia and North Africa. It is known for its very hot temperatures and high humidity during the summer months of May to October. July temperatures rise to 47°C with humidity reaching the saturation point. In winter, from November until April, the temperature drops to between 10°C and 25°C and the climate becomes pleasant. Rain falls between the months of November and April and is generally scarce. The average rainfall never exceeds 107 millimetres. The area is also exposed to storms due to climatic disturbances which occur in the Arabian peninsula. The daily average hours of sunshine vary between seven and 12 hours according to the season.

1.3.5 Finance and banking for construction

The most important source of funding for construction projects in the UAE is the budget allocation by the central government to finance development projects. This tends to be the case among all other member states of the Gulf Co-operation Council. These projects include road building, bridges, drainage and sewerage, public buildings and low cost housing projects. In Abu Dhabi there is another source of finance available for commercial buildings. This is run by the Department of Social Services and Commercial Buildings, more commonly known as H.H. Sheikh Khalifa Committee.
1.3.6 Role of banks

Banking in the UAE started in Dubai in 1946 when the British Bank of the Middle East (then known as the Imperial Bank of Iran) opened a branch to extend banking facilities to the active traders of the Gulf. According to Jones (1987, p. 14) “The Agreement between the Ruler of Dubai and the Bank was dated 5 January 1946. The Ruler agreed not to give permission for any other bank to open in Dubai for a 20-year period.” The currency of the time was Indian Rupees. Trade with India was brisk and when India became independent in 1947 the new Government declared that payments for Indian exports should be made through an authorised bank. The British Bank of the Middle East (B.B.M.E.) opened a branch in Sharjah in 1951 and another in Ras Al Khaimah in 1962. Some merchants in Dubai, with the help of the National Bank of Kuwait, established The National Bank of Dubai in 1963. Increasing business and gold trade were mainly responsible. The Indian Rupee was replaced in 1966 by the Bahrain Dinar in the Emirate of Abu Dhabi while other Emirates used the Saudi Riyal as their local currency. Then the Qatar-Dubai Riyal was introduced in place of the Saudi Riyal. The National Bank of Abu Dhabi was established in 1969. In 1971 the United Arab Emirate was created and the Currency Board was established in 1973 when it issued the UAE Dirham as the legal currency of the land. In the mid 1970’s there was a boom in banking and many foreign banks were attracted to the region. This resulted in overbanking, which was discussed in a research paper by Presley (1985). He stated that there have already been attempts to counteract overbanking. At that time there were 22 locally incorporated banks and 29 foreign banks.

According to the UAE Central Bank Annual Report (1992) there are now nineteen locally incorporated banks and twenty-eight foreign banks operating in the UAE. A numerical analysis for forty out of the forty-seven banks (Gulf News Special Report, June 23, 1993) is shown in Tables 1.4 and 1.5. The seven banks not included are four foreign banks operating only one branch each, the B.C.C.I. which stopped operating on the 5th July 1991, and two locally incorporated banks, namely the National Bank of Sharjah and the Commercial Bank International that operates only two branches. The analysis shows that most banks are doing well despite the high level of competition. The general increase in operating income revealed in the tables reflects
the overall growth in banking activity. Customer deposits, the major indicator of public confidence in the banks, are generally up. This reflects both continued confidence and the general increase in size in the UAE economy.

The Central Bank, which was set up in December 1980, enforces corrective procedures through directives. A minimum capital of Dh40 million was stipulated for both local and foreign banks along with a capital/assets ratio of 1:15. A recent directive advised banks not to lend more than 50 per cent of their capital to one bank so as to spread risk of inter-bank placements. Foreign banks are required to consider only their capital funds in the UAE for calculating the ratio of exposure with their own head-offices and branches abroad. Banks can only lend up to 5 per cent of their paid-up capital to any one director and up to 25 per cent to the board as a whole. Banks must obtain Central Bank approval before distributing dividends, remitting capital, or issuing new shares. They must supply the Central Bank with quarterly reports outlining their capital, shareholders equity, assets, profits and other details relating to their financial position. The Central Bank is aided by a risk bureau set up in 1982 to provide a better insight into the credit risk incurred by banks. The bureau collects and disseminates information about loans exceeding Dh0.5 million.
Table 1.4 Statistics for banks operating in the UAE

<table>
<thead>
<tr>
<th>BANK NAME</th>
<th>ACTUAL (Dh. million)</th>
<th>% GROWTH</th>
<th>ACTUAL (Dh. million)</th>
<th>% GROWTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADCB</td>
<td>9434.6</td>
<td>10239.2</td>
<td>10621.5</td>
<td>8.53</td>
</tr>
<tr>
<td>Arab Bank for Invest &amp; Foreign Trade</td>
<td>3967.37</td>
<td>4522.99</td>
<td>50118.83</td>
<td>14</td>
</tr>
<tr>
<td>Arab Emirates Inv. Bank</td>
<td>216.62</td>
<td>165.47</td>
<td>204.07</td>
<td>-23.61</td>
</tr>
<tr>
<td>Bank of Oman</td>
<td>10406.6</td>
<td>9777.28</td>
<td>10189</td>
<td>-6.04</td>
</tr>
<tr>
<td>Bank of Sharjah</td>
<td>NA</td>
<td>712.72</td>
<td>782.02</td>
<td>NA</td>
</tr>
<tr>
<td>Commercial Bank of Dubai</td>
<td>1401.5</td>
<td>2143.63</td>
<td>2251.48</td>
<td>52.95</td>
</tr>
<tr>
<td>Dubai Islamic Bank</td>
<td>NA</td>
<td>4044.56</td>
<td>4878.88</td>
<td>NA</td>
</tr>
<tr>
<td>Emirates Bank International</td>
<td>7600.88</td>
<td>11108.0</td>
<td>11354.7</td>
<td>46.14</td>
</tr>
<tr>
<td>First Gulf Bank of Ajman</td>
<td>512.32</td>
<td>605.52</td>
<td>713.43</td>
<td>16.15</td>
</tr>
<tr>
<td>Investbank</td>
<td>NA</td>
<td>1170.57</td>
<td>1345.14</td>
<td>162.1</td>
</tr>
<tr>
<td>Middle East Bank</td>
<td>NA</td>
<td>2467.21</td>
<td>1955.51</td>
<td>NA</td>
</tr>
<tr>
<td>National Bank of Abu Dhabi</td>
<td>23550</td>
<td>25446</td>
<td>24278</td>
<td>8.05</td>
</tr>
<tr>
<td>National Bank of Dubai</td>
<td>24144.4</td>
<td>24669.9</td>
<td>25373.1</td>
<td>3.06</td>
</tr>
<tr>
<td>National Bank of Faijerah</td>
<td>484.15</td>
<td>716.75</td>
<td>794.05</td>
<td>48.04</td>
</tr>
<tr>
<td>National Bank of Ras Al Khaimah</td>
<td>754.8</td>
<td>874.91</td>
<td>958.52</td>
<td>15.91</td>
</tr>
<tr>
<td>National Bank of Unn Al Qawain</td>
<td>574.18</td>
<td>724.35</td>
<td>890.37</td>
<td>26.15</td>
</tr>
<tr>
<td>ABN-Amro</td>
<td>423.53</td>
<td>112.38</td>
<td>1420.76</td>
<td>164.53</td>
</tr>
<tr>
<td>Arab African International Bank</td>
<td>623.4</td>
<td>481.91</td>
<td>309.14</td>
<td>-22.69</td>
</tr>
<tr>
<td>ANZ Grindlays</td>
<td>872.56</td>
<td>939.17</td>
<td>1231.71</td>
<td>8.34</td>
</tr>
<tr>
<td>Arab Bank</td>
<td>1212.9</td>
<td>1512.3</td>
<td>1773.46</td>
<td>24.63</td>
</tr>
<tr>
<td>Banque de L'Orient Arabe</td>
<td>NA</td>
<td>328.69</td>
<td>368.7</td>
<td>NA</td>
</tr>
<tr>
<td>Banque du Caire</td>
<td>163.49</td>
<td>251.06</td>
<td>271.68</td>
<td>53.36</td>
</tr>
<tr>
<td>Banque Indonex</td>
<td>192.87</td>
<td>231.31</td>
<td>241.83</td>
<td>30.85</td>
</tr>
<tr>
<td>Banque Paribas</td>
<td>NA</td>
<td>505</td>
<td>571</td>
<td>NA</td>
</tr>
<tr>
<td>Banque Lebanonaise</td>
<td>NA</td>
<td>250.33</td>
<td>249.86</td>
<td>NA</td>
</tr>
<tr>
<td>Banque de Barbados</td>
<td>374</td>
<td>568.23</td>
<td>759.6</td>
<td>51.53</td>
</tr>
<tr>
<td>Bank Melli Iran</td>
<td>526.05</td>
<td>573.54</td>
<td>832.34</td>
<td>0.03</td>
</tr>
<tr>
<td>Bank Saderat Iran</td>
<td>779.31</td>
<td>1239.02</td>
<td>1453.78</td>
<td>58.98</td>
</tr>
<tr>
<td>Barclays Bank</td>
<td>495</td>
<td>684.45</td>
<td>736.62</td>
<td>38.27</td>
</tr>
<tr>
<td>British Bank of the Middle East</td>
<td>4828.55</td>
<td>5800.57</td>
<td>6462.07</td>
<td>20.13</td>
</tr>
<tr>
<td>Citibank</td>
<td>1463.58</td>
<td>2193.21</td>
<td>2754.76</td>
<td>49.85</td>
</tr>
<tr>
<td>Habib Bank</td>
<td>547.57</td>
<td>1071.5</td>
<td>1103.4</td>
<td>13.07</td>
</tr>
<tr>
<td>Habib Bank AG Zurich</td>
<td>937.36</td>
<td>1248.76</td>
<td>1297.79</td>
<td>33.22</td>
</tr>
<tr>
<td>Janata Bank</td>
<td>NA</td>
<td>202.7</td>
<td>212.79</td>
<td>NA</td>
</tr>
<tr>
<td>Lloyds Bank</td>
<td>918.5</td>
<td>875</td>
<td>976.75</td>
<td>-4.74</td>
</tr>
<tr>
<td>National Bank of Bahrain</td>
<td>79.4</td>
<td>126.85</td>
<td>121.78</td>
<td>59.78</td>
</tr>
<tr>
<td>Royal Bank of Canada</td>
<td>291.7</td>
<td>248.35</td>
<td>238.53</td>
<td>-14.86</td>
</tr>
<tr>
<td>Standard Chartered</td>
<td>1385.76</td>
<td>1983.66</td>
<td>2518.01</td>
<td>43.29</td>
</tr>
<tr>
<td>United Bank</td>
<td>NA</td>
<td>1879.41</td>
<td>1957.29</td>
<td>NA</td>
</tr>
<tr>
<td>United Arab Bank</td>
<td>1128.68</td>
<td>1072.45</td>
<td>1094.79</td>
<td>-4.98</td>
</tr>
</tbody>
</table>

Source: Gulf News Special Report (June 23, 1993)
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1.3.7 The construction industry

The most loan-sensitive of all sectors of the economy is the construction industry. The dramatic increase in construction projects in the UAE during the past two decades was the result of the discovery of oil. Figure 1.2 shows that there is a significant relationship between oil income and expenditure on construction. There are, however, economic and political conditions that cause cyclicality in the construction industry which make the volume of construction rise and fall.

1.4 Need for the research

Banks have traditionally played key roles in providing finance for construction contractors. This research analysed 28 different construction projects and found that the contractors employed to execute them all relied on some form of bank finance. This confirms the interdependence between the construction industry and banks. A clear indication of how important construction contractors treat the subject is in their increased reliance on in-house financial experts. Seventy-five per cent of the contractors who completed the research's questionnaire confirmed that they use in-house financial experts. Fifty-nine per cent of them also considered Project Related Finance as very important and 17 per cent of them considered it important.

After forming the research objectives and methodology, the initial part of the research was devoted to literature review and data gathering through sending out questionnaires to both lenders and borrowers and holding interviews with a selected number of them. This was carried out as follows:

- formation of two sets of questionnaires for borrowers and lenders to complete;
- sending out of 320 sets of questionnaires to contracting companies and 42 sets to banks;
- holding interviews with senior personnel of twenty contracting companies and eight banks;
• three different projects that were currently under construction during the research were chosen as case studies to reinforce the results of the findings;

• an extensive literature review was conducted in all matters relating to construction contractors' finance; and

• an analysis of the findings was carried out and the research was concluded with a summary of research findings, definitions and recommendations.

1.5 Guide to the thesis

This report comprises ten chapters. The following is a guide to the thesis and presents a brief description of the contents of each chapter:

Chapter One contains a general background to the research. It states the objectives of the research, describes its locality and the need for it. It also gives a summary of conclusions and recommendations. The research methodology, the hypotheses and assumptions the author formulated to explain the concept of Project Related Finance are contained in Chapter Two. The historical background of construction finance and a general overview of the financial planning and financing of projects is discussed in Chapter Three. It also discusses security and the extending of credit. The fourth chapter highlights the importance of the project cost estimate to both the construction company and the lending bank and the means of its evaluation. It briefly discusses planning techniques used on construction projects. The material presented in Chapter Five is the result of a comprehensive investigation on the various conditions of contract that are currently employed internationally and in the UAE. It includes a comparison between some local conditions of contract and international ones. It also covers typical aspects of a project's construction phase and methods of control. Chapter Six identifies the main areas of risk in construction and offers the lender methods of how to assess these risks. Chapter Seven is devoted to data gathering through the use of questionnaires, interviews and case studies. The data gathered (see Appendix A) is analysed and tested in Chapter Eight. The basics of Project Related Finance are presented in Chapter Nine. It also offers guidelines to borrowers and lenders for adopting the strategy. Chapter Ten is a summary of the research findings.
and the main conclusions. The chapter also includes recommendations to industry and further research.

1.6 Summary of main conclusions and recommendations

The findings of the research proved to be supportive enabling it to define Project Related Finance and its decision making criteria.

Although banks generally viewed the financing of contractors to execute construction projects a high risk business, the research found that 45 per cent of banks extended Project Related Finance facilities. It also found that 73 per cent of contractors used Project Related Finance and that on average they used banks to cover 66.28 per cent of the finance required for the execution of construction projects. The research, however, could not find any correlation between the percentage of bank finance and company turnover. This indicates that the size of the company is immaterial as far as the requirement for Project Related Finance is concerned.

The research proved through the case studies that the accumulated value of work certified always fell short of accumulated cost for a considerable proportion of the contract duration. This indicated the need for contractors to find finance for their operations until such time when progress payments are sufficient to meet costs.

As the research was directed at the mutual needs of banks and contractors, it was able to give guidelines and recommendations which focused on the decision making process of lenders and the objectives of borrowers. The research concluded that extending Project Related Finance was a top-level strategic decision taken after a thorough investigation of the market, the contracting company and the project. It also concluded that banks viewed extending Project Related Finance with caution, stressing the need for recourse to the parent company.

Recommendations were made to industry on ways to achieve higher returns on the banks' massive investment in construction contracting. These include better market research, contractor evaluation and project analysis.
CHAPTER TWO

RESEARCH METHODOLOGY
CHAPTER 2 RESEARCH METHODOLOGY

2.1 Introduction

In order to achieve the study’s objectives, an extensive literature review on the subject of Project Finance with construction contractors in mind was undertaken to see if the literature treatment of the subject could be used to formulate the basis of Project Related Finance. The literature review was broadened to include the financial, contractual and operational aspects of construction management. This preliminary work led the research to investigate the financing of construction contractors in general and project-related loans in particular. It then focused on the concept of financing contractors on a project-by-project basis. To investigate this line of finance, it was necessary first to arrive at a definition of the subject and second to investigate the reactions of those who participate in it. In order to achieve this, nine assumptions and seven hypotheses were formulated. This approach necessitated conducting a questionnaire survey, interviews and case studies to gather data in order to test the assumptions and hypotheses. Two sets of questionnaires were formed for this purpose, one for contractors and another for lending banks. The contents of the questionnaires were directed at finding the strategic perspectives of the contractor as the prime borrower and the bank as the prime lender when faced with organising Project Related Finance. Field interviews with selected bankers and contractors actively participating in Project Related Finance were conducted and their views recorded. Three case studies using Project Related Finance methods were chosen to be investigated from a database containing twenty-eight. The objective of the investigations was to provide an insight into the practical world of Project Related Finance borrowing and its effect on the progress of a construction contract, taking into account the views of the professional engineers in charge.

The research then involved an analysis of the concept of Project Related Finance for construction projects.
2.2 Development of the questionnaire

When using questionnaires, it is crucial to establish first the information to be gathered so that only the relevant questions are asked. Before formulating any questionnaire items, literature relating to questionnaire design and analysis was reviewed. The literature review gave the following points to aim for when designing a questionnaire:

- to be clear about precisely what is required
- to design the questions to satisfy the objectives of the research
- to use simple language and avoid technical terms in order to minimise any potential errors from respondents
- the concept of standardisation should be employed to ensure that any variations are the result of true difference of opinion. (May, T., 1993, p.67).

As the questionnaire was aimed to gather information from two different sources, it was necessary to design two versions whilst keeping in mind the concept of standardisation. Each version was made up of two parts. Part 1 related to the definitional criteria of Project Related Finance and was therefore common to both versions. It contained the nine assumptions describing Project Related Finance. Part 2 was a survey of the practice and was designed to test the hypotheses and to satisfy the other objectives of the research. The questions in Part 2, however, had to be formulated in the bankers' and the contractors' versions in a way that is acceptable to each group. The questionnaire was piloted by consulting colleagues in the banking and construction industries for their opinion.

The questions in Part 2 of the bankers' version were as follows:

Questions 1 and 2 relate to the degree of importance banks give to Project Related Finance and the total value of finance given to construction in one year. Question 3 relates to geography and locations. Question 4 investigates whether the bank has a specialized department to handle Project Related Finance. The foregoing questions were designed to satisfy the research assessment of bank finance for construction
contractors. Question 5 establishes whether the lending bank investigates the relevant criteria as set out in Hypothesis Number 4. Question 6 examines the technical capability of the contractor to execute the project. Question 7 ascertains whether finance given is linked to the project and the measure of protection against default. Question 8 enables the research to test Hypothesis Number 1 asserting that contractors resort to Project Related Finance only to increase their borrowing capability. Question 9 relates to Hypothesis Number 6 monitoring progress as per cash flow. Question 10 relates to hypotheses Numbers 3 and 7 regarding assignment of proceeds and right of recourse. Questions 11 to 18 were designed to satisfy the first and third objectives of the research concerning the assessment of bank finance for construction contractors, and the lending banks' reaction to Project Related Finance. Question 19 investigates whether contractors' classification has any effect on the lending banks' decision-making process to extend finance facilities. Question 20 asks how much importance lending banks place on foreign content risk in a project. Risks are also investigated in question 21 enabling the research to produce a risk analysis report (see Table 7.4 Acceptability of Risk by Banks in Construction Projects). It was also used to test Hypothesis Number 2.

The questions in Part 2 of the contractors' version were as follows:

Questions 1 to 4 relate to type of business, turnover, facilities and the importance of Project Related Finance. Question 5 ascertains if the contracting company uses an in-house financial expert. Question 6 establishes the degree of reliance on bank finance in percentage terms. Question 7 tests Hypothesis Number 1. Question 8 is to assess the degree of preference for Project Related Finance to satisfy the objectives of the research. Question 9 is to test Hypotheses Number 4 and Number 6. Question 10 investigates the risk in linking finance facilities to the project alone. Question 11 tests Hypothesis Number 3. Questions 12 to 15 relate to the main objectives of the research. Question 16 asks how much importance is placed on foreign content risk in a project. Question 17 tests Hypothesis Number 2. It also investigates risks in construction projects enabling the research to produce a risk analysis report (see Table 7.3 Acceptability of Risk by Contractors in Construction Projects).
2.3 Sampling

The sampling frame was a list of the construction companies from the Contractors' Directory in the UAE.

A stratified sample was taken and the stratification was based on turnover.

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From the above total number of companies in the three groups a random sample was chosen systematically, i.e. every other firm on the list. The attempted sample totalled 320, consisting of 15 large turnover companies, 150 medium turnover companies and 155 small ones. The sample taken was therefore approximately 50 per cent of each strata.

The response rate was 33 per cent of the large turnover companies, 1.3 per cent of the medium turnover companies and 15 per cent of the small turnover companies. This, therefore, represented 16 per cent, 0.1 per cent and 11 per cent respectively of all companies in the three groups. The poor response rate (0.1 per cent) from the medium turnover companies was so small that it was disregarded. The analysis was therefore based on the two groups, i.e. large and small turnover companies. Literature on survey methods (Moser & Kalton, 1971, p.262) quotes that a response rate of 10 percent is acceptable.

2.3.1 Sampling error

An analysis of the errors associated with the actual sample response is shown in Appendix D. The errors are found to be within ± 12 per cent of the mean value percentage of finance from banks.
2.4 Formulating the hypotheses

To arrive at the research objectives seven hypotheses were formulated explaining the author's understanding of the concept of Project Related Finance, its strategies and its decision-making criteria. The hypotheses, therefore, had to contain all the elements that influence financing construction contracting on project by project basis. The contractor's borrowing capability, the financial standing of the employer, the cash flow of the project, the lender's concern with risk and right of recourse are all salient points that had to be put forward for investigation and testing.

2.5 The research hypotheses

The research hypotheses were composed after an extensive literature review. This developed into formulating the idea of Project Related Finance for the execution of construction contracts through borrowings from banks. These hypotheses were tested against the findings of a questionnaire completed by both contractors and bankers, and with interviews conducted by the author with a selected number of participants. The hypotheses of the research are as follows.

**Hypothesis Number 1**

The financing structure in the execution of construction projects is a combination of bank loans secured by equity and the contractor's own resources. Contractors resort to Project Related Finance for certain projects that are acceptable to lending banks, only to increase their borrowing capability and consequently to enhance their financial stability.

**Hypothesis Number 2**

When approached by construction contractors for Project Related Finance, the lending banks will view their risk exposure as the main criteria before participating in such ventures. If such risks can be defined and tested, then a Project Related Finance lending policy can be formulated.
Hypothesis Number 3
Extending credit and transfer of risk are main functions of Project Related Finance. Unlike conventional corporate borrowing, the debt risk to the borrower is significantly less than the loan security and credit risk to the lender.

Risk transfer is achieved when lenders can treat receivables from the construction project as a substitute for the credit-worthiness of the borrower.

If the credit rating of the project itself can be determined and tested, then it will be possible to minimise the risk exposure of the lending bank and consequently enable it to offer better finance facilities to the borrower.

Hypothesis Number 4
Before providing Project Related Finance, lending banks analyse the ownership structure and the accounts of the parent company. They perform an analysis of the consolidated accounts to satisfy themselves about the adequacy of the working capital and the gearing of the company. If the working capital and gearing of the borrowing company are not within acceptable limits then the bank may not grant Project Related Finance facilities.

Hypothesis Number 5
One of the lending bank's main concerns in Project Related Finance situations is the financial standing of the project's employer. This is important as it helps to avoid default in progress payments. Of equal importance is the borrower's technical capability in order to ensure good performance.

If the employer's financial standing or the borrower's capability to execute the proposed project were in doubt, the lending bank would not take part in the venture.

Hypothesis Number 6
When considering a Project Related Finance package, lending banks will scrutinise the project's cash flow to ascertain that the security in the project's progress payments and the lending margins match their price for funding the project. The lending banks
will take the necessary steps to ensure that the borrower’s projected cash flows are adequate, as precautionary measures may be taken to reduce or limit the facilities extended if the borrower’s cash flow proves inadequate.

**Hypothesis Number 7**

Lending banks in a Project Related Finance situation will not surrender all their traditional rights of recourse to the borrower in favour of project progress payments. This is to ensure that if the project should run into difficulties the lending bank will not be totally exposed.

**2.6 Assumptions on Project Related Finance**

In order to define Project Related Finance and differentiate it from the traditional methods used by banks in commercial lending, nine assumptions were formulated to define the act of lending to execute the construction contract on a project-by-project basis:

1. Project Related Finance is a form of lending designed to help both the borrower and the lending bank make the most of the investment by linking loan repayments to the construction project’s own cash flow.
2. Project Related Finance differs from Company and Corporate lending because the project loans are not completely secured by the value of the assets being financed. The lending bank must, therefore, consider progress on the project itself for returns and share major business risks.
3. Project Related Finance involves assigning the project’s earnings to the lending bank and may compel the bank to participate in controlling the project.
4. Project Related Finance is purely another form of bank loan designed to increase the borrowing capability of the construction contractor.
5. Project Related Finance is the means to bring together a complete package of financial commitments from the lending bank, and guarantees from the borrower, to ensure the successful completion of the construction project.
6. Project Related Finance structure is more advantageous to the lender through its facility to control risk by separating the project’s revenue from revenue of other operations.

7. Project Related Finance allows the borrower not to guarantee all debts because the lending bank relies on the project’s performance for risk protection.

8. Project Related Finance means a higher debt-to-equity ratio resulting in a less risky investment for the borrower due to the absence of direct financial guarantees.

9. Project Related Finance is more attractive to lending banks than other financing methods because of the anticipated higher income through larger margins and management fees.

2.7 Summary

The concept of Project Related Finance has been introduced in the form of hypotheses containing all the pertinent elements that influence financing the execution of construction contracts on project by project basis. These elements relate to the borrower, the lender, the employer and the project. To define Project Related Finance, nine assumptions are introduced that evolve around linking the loan repayments to the project’s own cash flow, the offer of security and guarantees by the borrower, and financial commitment by the lender. These assumptions and hypotheses are to be tested against the questionnaires and the interviews.
CHAPTER THREE

FORMS OF FINANCE
CHAPTER 3 FORMS OF FINANCE

3.1 Introduction

Bank finance supported and in some instances led the economic transformation of nineteenth century Europe and the Americas. The role of banking expanded and was inextricably linked to the development of industries and professions. The first instances of project finance were when banks raised capital for the great railway projects of the nineteenth century. The Brussels banker, Baron Maurice de Hirch, acquired the concession for the successful Turkish railways project in 1869 and the Paris to Constantinople line was completed in 1888.

The successful private bankers in France, La Haute Banque, provided finance for canal construction in the 1820's. The Société Général de Crédit Mobillier, promoted in 1852 by the Perière family, gave long-term financing to the French transport system and to the principal heavy industrial projects of the time.

The Japanese banks adopted Western traditions in the development of their banking structure and operations. Alexander Allan Shand, who had learnt his banking skills in Britain, was a major influence on the Japanese system in Yokohama in the 1870's, and afterwards as a manager of Parr's Bank, London, the principal banking agents of Japan at the time.

The Western influence on newly developing countries was more direct through the powers of the European empires. Britain, France, Germany and other major powers exported banking capital and expertise to operate the colonial banks. The British influence on overseas banks operating in British colonies was further reinforced when, in 1846, all colonial joint-stock banks became subject to supervision by the British Government. Many of the leading banks which were promoted in British territories, (such as The Imperial Bank of Persia founded in 1889 and now known as the British
Bank of the Middle East) participated in railway project finance for foreign states as well as deposit banking.

3.2 Financial planning of the construction project

A project's financial planning involves investigating the following:

- the level of cash needed to be on call at various dates during the project's duration;
- the level of labour, plant, and materials needed on site;
- the period of credit offered by suppliers and the amount of cash discount offered if suppliers are paid quickly;
- the bank over-draft repayments;
- the proportion of current assets to be financed by short-term funds; and
- maintaining the working capital at an acceptable level.

A project's financial planning is short-term and mainly concerned with working capital (excess of current assets over current liabilities). It concerns the utilisation of a company's funds in a project.

The successful management of working capital depends upon knowledge of the cash flow position of the company. The problems of short-term financial planning are as complex as those of the longer term. Project management's main concern is to maintain sufficient cash available to pay for all the normal running expenses and avoid costly emergency borrowing (Figure 3.1). The project's finances should be planned so that management does not have more cash than is needed as idle cash is wasteful. However, management must guard against maintaining extremely low cash balances as this could lead to difficulties. Delay in paying suppliers and sub-contractors may mean losing discounts or even business with them altogether.
Figure 3.1  The financial cycle of a typical construction project
3.2.1 Controllability of working capital

Working capital in construction is influenced by the following elements:

- **Receivables**
  The biggest influence on this element is the volume of turnover and the length of credit given. A major part is played by the effectiveness of the credit control and speed in progress payment certificate collection.

- **Stocks**
  Stocks are influenced by volume and variability of demand for materials, and the volume of work done and certified.

- **Payables**
  Payables are influenced by the length of credit allowed and taken and the volume of purchases.

Whereas the levels of working capital in retail can be very low with high level of creditors and, in contrast, manufacturing requires higher levels of working capital with a high level of debtors, the right level of cash is more difficult to pinpoint in the construction industry.

Some companies have to find finance for their operations within the first three months of the projects. Other companies, on the other hand, because they are working in a different locality and for a different employer are more cash rich. This is due to generous advance payments. The successful control of working capital or cash depends on detailed budgets which must be as accurate as possible.

According to Gabrieleczyk (1986, p.91), the amount of working capital which might be needed by an enterprise is determined by two factors:

- the time-lags inherent in the transaction cycle of the business
- the volume of trade
The effective management of working capital involves the striking of an acceptable balance between liquidity and profitability.

3.2.2 Limited recourse finance

In this form of finance, the lending bank expressly assumes certain of the commercial risks attached to the project. The lender’s recovery may be limited to the cash flow from the project and to the security over the project without a claim against the borrower for any shortfall.

Project loans generally involve a degree of equity risk in the sense that they rely on the project for their pay-out and not the general credit of the borrower. Lending banks are known to resort to the mortgage of borrower’s property to limit the equity risk.

3.3 Financing the project

In theory, there are as many definitions of ‘Project Finance’ as there are projects. In recent years there has been considerable interest in a new type of private loan that is tied as far as possible to the fortunes of a particular project thereby minimising the exposure of the parent company. Such a loan is referred to as Project Finance and is a speciality of certain banks. According to Price (1994):

"The owner of the project and the owner of the company do not have to be the same, and on many major capital projects the shareholders of the sponsor can only guarantee the large financial resources required by using the project's future cash flow, hence the term 'project finance'."

On project finance, Samuels et al (1990, p. 507) stated that it is “limited to those cases where it is possible to identify a particular project and to be able to identify an income stream that results from the project”.

The basic requirement of Project Finance is that the project be physically isolated from the parent company and that it offers the lender tangible security. Project
Finance is workable only when the sums involved are large and where management fees are levied by the lending Bank.

The purest, but least common, method of Project Finance offers the lender no recourse against the borrower at any stage. This idea of no recourse is somewhat imprecise, for banks require assurances from the parent that it will perform and complete the project on time. However, most project loans provide lenders with some recourse against the parent. One of the most common threats to a successful project loan is a serious delay in completion. In any project financing, the payments on the loan should correspond as closely as possible to the project’s ability to generate cash. For example, if the project’s completion date has become uncertain due to changes that increased the scope of the works, it is common to increase proportionally the assignment of revenues to loan repayments rather than to a fixed sum.

In Europe, ‘Project Finance’ stands for meeting the financial needs of a project. This entails the assembling of various financing sources for one project. In contrast to this definition, in North America and Australia ‘Project Finance’ represents the financing of a specific project on its own credit capacity and merits, that is cash flow financing. This approach to obtaining loans relies primarily on the expected flow of cash produced by a specific project and not the financial strength of the sponsor. There is a world-wide trend to understand and apply both techniques. The sources of credit for Project Finance, according to Howcroft (1986, p. 17), can be categorised as follows.

"Bank Lending
Institutional Lenders
Export Credit Agencies
International Agencies such as the International Bank for Reconstruction and Development"

It is evident that the competition for construction work has become very fierce as the engineering know-how for conventional construction contracts becomes widespread. The growth in the size and cost of projects over the years has brought a new dimension to the construction industry: that of international project financing. Nowadays quite often contractors have to offer a ‘financial package’ as part of their
tender for a project. In order to be competitive, increasing numbers of international contractors approach the export credit agencies of certain industrialised countries for support. These export credit agencies promote the national interests of their countries by offering financial support to exporters of eligible goods and services for periods ranging between two to ten years. The principal advantages of export credit agencies are as follows:

- Deferred payment terms with attractive long-term interest rates to buyers;
- Protection against non-payment to suppliers; and
- Low risk-weighted assets to lending banks.

The major export credit agencies are:

- UK ECGD
- USA USEXIM
- Japan JEXIM
- France COFACE
- Italy SACE/MCC
- Germany HERMES/KFW

Export credits can, therefore, be utilised as part of the funding mix and are beneficial in closing the financing gaps.

Stallworthy & Kharbanda (1985, p.23) stated that: "It seems that an attractive financial package can tip the scales in favour of an otherwise uncompetitive tenderer". Project Finance has become more important internationally as it offers financial knowledge and assistance to secure a complete bid package. This is almost a compulsory prerequisite for the future success of a proposed project.

3.3.1 Ideal financing objectives

The financial aspects for projects are of paramount importance, and are considered as a differentiation tool for construction contractors. They will look for the following factors which they consider as crucial parameters for financing their operations:

- Low interest rate;
- Maximum credit support; and
Integration of syndicated loans where applicable.

The above three factors have to be complemented with the following:

- How to find financially strong partners;
- How to gain access to long term fixed rate funds; and
- How to avoid direct sponsor guarantees.

Table 3.1 Ideal financing targets

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<td>• suitable partners: suppliers, sponsors, users, operators, lenders</td>
<td>• risks for interested parties (except lenders)</td>
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<tr>
<td>• simplicity of structure</td>
<td>• direct sponsor guarantees</td>
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<tr>
<td>• speed of assistance</td>
<td>• currency exposure</td>
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<tr>
<td>• early commitment</td>
<td>• refinancing risks</td>
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<tr>
<td>• flexibility of repayments</td>
<td>• formalities (red tape)</td>
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<tr>
<td>• non-equity financing</td>
<td>• financing cost/spreads</td>
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<tr>
<td>• long-term funds, fixed rate</td>
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3.3.2 Lending banks' reaction

Generally, the instability of the present and the uncertainty of the future makes bankers cautious despite the present construction boom that is taking place in the region in the aftermath of the Gulf war.

The volatility of interest and foreign exchange rates combined with more frequent cyclic business trends exposes the construction industry and banks to greater risks. As projects have become more complex and capital intensive, and with participants coming from various countries with different priorities and values, legal and administrative procedures have become very burdensome.
Political uncertainties have made lenders more short-term oriented. Fixed rate money has become relatively scarce and poses re-financing problems for banks. This compels them to adjust to a rapidly and constantly changing financial environment, and be ready to act at short notice.

3.3.3 Common elements of financeable projects

The following are some basic principles that any lending bank would adhere to before committing itself to financing the execution of a construction project:

- **Acceptable country risk.** International banks set their own lending limits for different countries. They are showing more concern about political risks and are more cautious where frequent political changes take place.

- **Serious commitment.** Banks are more positive when the project’s sponsors use well-known professional teams of consulting engineers for the design and supervision of the proposed project. This represents tangible evidence of a true commitment and should therefore be met with an objective assessment.

- **Suitable management.** Quality, hard work and commitment of the contractor’s management team are the main issues in evaluating a construction company. Any new construction project is bound to place stresses and strains on management resources.

- **Favourable economic conditions.** Banks must look into the state of the construction industry at the time and ensure sufficient safety margins. The proposed project will have less chance of receiving funding if the economy is in recession.

- **Appropriate credit structure.** The legal structure has to complement the business whatever the credit support.
• **Sources of financing & optimal plan.** Lending banks and borrowers have to agree the allocation of financing sources and risks among themselves. They should also investigate their responsibilities under possible unfavourable scenarios so that a formal plan can be founded on conservative project economics.

### 3.4 Security

Most construction firms do not have ready, liquid assets to offer as collateral for a loan. Cash balances are typically low. Fixed assets may already be pledged as collateral for finance. It is normal practice for firms to offer project receivables as collateral, especially for lines of credit being used to finance the receivables. A lending bank should examine the quality of the receivables which always lead back to the project’s employer. Contractors are required to give employers performance bonds for the proper and timely execution of projects. If the Contractor does not complete work on a project as agreed, the Employer is entitled to hire another firm to finish it at the Contractor’s expense. Recourse rights of the Employer will take precedence over the bank’s assignment rights.

If a long-term debt is being used for the purchase of a fixed asset, the fixed asset itself can serve as collateral.

Property is theoretically divided into three classes:

- immovables;
- tangible movables, such as goods, equipment and machines; and
- intangible movables, such as contracts, debts, and shares.

Each type of property attracts its own rules but the following are some questions for practical consideration.

- How conclusive is the borrower’s title to the collateral?
- Will the security interest have priority over the claims of other creditors?
- Will the value be effectively maintained?
Security documents in respect of land, investments and shipping often contain an express provision that in the event of the collateral falling below a stipulated amount (usually a given margin above the principal), then the borrower will top it up with additional security.

- Should the lending bank check the borrower's other loan contracts to see if a security interest violates a contractual prohibition?
- Does the security interest have to be registered?
- Will the security catch after-acquired property?

Examples of after-acquired property are buildings built on mortgaged land, and additions to chattels such as new engines to plant, etc.

- Would the security be discharged by a roll-over of the loan, for example on a currency conversion?
- Does the mortgage debt have to be expressed in local currency even though the loan itself is denominated in a foreign currency?
- On a default, what restrictions are there on the right of sale?
  - Must the collateral be sold by public auction, or is a private sale permissible?
  - Does the mortgage have a duty of care to obtain the best possible price?
  - Are there any sale restrictions such as prohibitions to dispose of the land and strategic assets concerned to foreign or rival concerns?
  - Does local exchange control permit the repatriation of funds?
- On default can the secured party, as an alternative to sale, take possession of the security and collect the income from it in rents and hire until the income received therefrom is sufficient to satisfy the claim?
- Will foreign courts have jurisdiction to enforce the security interest?

3.4.1 Extending credit

With most loan applications, the credit standing of the borrower is the deciding factor of whether or not the money will be advanced. There are two main types of loans:

- secured loans; and
- unsecured loans.
The security in the secured loans usually takes the form of mortgage of the fixed assets and of the borrower’s personal guarantees. The unsecured loan, however, is simply a debt backed by the general credit of the borrower. It is not secured by assets. Unsecured loans usually contain ratio covenants and provisions calculated to accelerate the loan should the borrower’s financial condition begin to deteriorate.

Large unsecured loans are available only to the most credit worthy companies with a long history of financially successful operations and good relationships with their lenders. Unsecured loans are available to projects whose sponsors, owners and managers have established a good reputation and who have sufficient capital to meet the equity risk capital needs of the project. Third party lenders take a commercial lending risk. They do not take an equity risk. On a risk-reward basis, the profit a lender realises on a loan limits its risk to lending-type rather than equity investor-type risks.

With Project Related Finance, however, although the credit quality of the borrower is of importance, the key consideration is its technical capability to perform. This helps to ensure that the projected revenue can be generated to repay the loan.

With this type of loan, the lending bank may not have all the usual recourse to the borrower’s assets as in corporate lending. Therefore, if the borrower performs badly or abandons the project altogether, the bank could be exposed to the full value of the agreed limits. To compensate for the higher levels of risk in Project Related Finance over their traditional means of providing finance, banks frequently require higher than normal returns on their loans.

Project Related Finance is a secured finance. The security includes the assignment of progress payments, the establishment of an account with the lending bank to receive all the project’s receivables, mortgage over some of the contractor’s inventory and equipment, the assignment of insurances and, in certain cases, the personal guarantees of the borrowers.
Wood (1980, p. 323) stated:

"In many cases project security is primarily negative, a shield rather than a sword, and intended rather
(i) to prevent other creditors from obtaining adverse interest in the project assets and thereby holding the lenders to ransom; and
(ii) to strengthen the lenders' political bargaining position."

The purpose of security is to enable the lending bank to sell it in the event of default and to use the proceeds to reclaim the loan.

In Project Related Finance situations, the lending Bank’s ability to monitor progress and exercise financial controls over the project can be more important than the ability to realise the contractor’s assets by the sale. In practice, contractors’ project assets are often not marketable because of certain clauses in the contract prohibiting their removal from site before completion. In the event of a contractor’s non-performance, however, security may enable the lending bank to take over and complete the project for its own benefit.

However, the following weaknesses of project security may be noted:

- By law, the lending bank cannot take possession of the contractor’s movable assets on the project’s site
- The assets, if taken after liquidation, are not easily marketable and the lending bank may be forced to dispose of them at a great loss.
- Enforcement remedies are so limited that they are virtually useless. It is unlikely that the lending bank would succeed where the contractor has failed.

3.4.2 Off balance sheet financing

Normal balance sheet lending is practised by banks after satisfying themselves that the assets that appear on the borrowing company’s balance sheet are of sufficient quality to repay the loan and interest. The debt will then appear on the company’s balance sheet with the company’s assets acting as security. It is possible, however, for a company to obtain an off balance sheet loan. Such loans do not appear on the balance sheet and are not secured by the company’s assets but by other means such as bonds, leases and commercial paper market.
3.4.3 Guarantees

Guarantees are usually taken to provide a second source of payment should the first source run out of cash. However, guarantees are sometimes requested, and given, for other purposes. In Project Related Finance, the lending bank may demand the owners of the contracting firm to give their personal guarantees to support their request for facilities. This policy will reduce the credit risk of the loan.

3.4.4 Guarantors

Where the loan is guaranteed, the guarantor is always the basis of the credit. Events of default in relation to the guarantor are more important than default by the borrower.

It is important for the bank to obtain personal financial statements from each guarantor. The guarantor is made personally liable in the event of the firm’s failure to repay the loan.

If the lender materially alters the loan agreement, the guarantor is discharged as the guaranteed obligation has been changed. However, if the lender agrees to reduce the borrower's liabilities to enter into a composition with the borrower, the guarantor is discharged.

3.4.5 Term loan agreements

A term loan may be 'revolving' (i.e. the borrower can borrow, repay and re-borrow during the commitment period up to a stated maximum amount). The loan may be made available on a stand-by basis.

According to Brealey and Myers (1981, p. 626):

"Term loans are for the most part unsecured debt. The conditions of a term loan are like those of most unsecured bonds. They generally do not include the very restrictive negative conditions of private placement bonds, but they do impose affirmative conditions on net worth and working capital. Because many term loans are made to small companies, they often impose conditions on senior management. For example, the bank may require the company to insure the lives of senior managers, may place limits on management's remuneration, and may require personal guarantees for the loan."

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3.4.6 Financial covenants

Commercial banks generally have developed sophisticated financial covenants and asset tests for determining term lending. Financial covenants are gaining general international acceptance and are used by banks as an alternative to the traditional accounting methods of exercising actual control over the affairs of their borrowers. Penn et al (1987, p. 108) stated:

"The financial covenants are designed to protect the lender's position should the borrower's credit-worthiness begin to deteriorate. They require a flow of financial information from the borrower to the lender which enables the lender to monitor the borrower's financial health, providing, of course, the lender is in a position to check compliance".

The financial covenant has the advantage of clarity and decisiveness. Adverse changes in the borrower's financial condition cannot be allowed. The borrower must maintain its net worth at a minimum stated figure. Financial covenants have the positive function of disciplining and directing financial policies. They achieve this by controlling excessive growth, limiting dangerous liabilities and restricting drains on cash resources. The breach of a financial covenant serves as an early warning, enabling the lender to accelerate the loan repayments before actual insolvency.

Limiting the credit risk of loans to construction companies can be effected by employing the following financial covenants.

- Limits on staff compensation
- Limits on dividends
- A maximum level of debt
- A minimum level of working capital
- A minimum level of equity
- Limits on pledging of assets as collateral for more borrowing
- Limits on further fixed assets purchases

3.4.7 Weaknesses of financial covenants

Financial covenants cannot give complete protection for the following reasons.
- Contravention will only come to light long after it occurs and only when the borrower's accounts are examined.
- Different accounting methods give rise to substantially different results. The risk of an unintentional technical default is more likely due to the ever-changing accounting standards.
- Accounts are prepared on the basis that the borrower is a going concern. Financial ratios which make the borrower seem viable cannot take into account the reduced break-up value of the borrower on liquidation.

3.4.8 Net worth minimum

The covenant requires the maintenance of a minimum figure for the borrower's net assets after deduction of its liabilities. This is an indication of what would be left if the borrower's assets were sold at book value and all its liabilities paid in full. A restraint on the distribution of profits to shareholders can be introduced to limit the depletion of cash resources. Bonus share issues are usually allowed since they do not cause any drain of cash.

3.4.9 Financial ratios

The most common method of analysing accounts is by the use of financial ratios. These ratios are used by analysts when making investment decisions, and by management for both interpreting past performance and setting targets against which future performance can be measured. Any one ratio should not be analysed and interpreted in isolation of others. Ratios are more useful when used as comparisons. They can be divided into four categories: those measuring profitability, those measuring liquidity, those measuring overall financial strength, and those measuring activity. Assessment conclusions should only be drawn in the light of inter-related interpretation of various ratios viewed from the total picture of the company. For the purpose of evaluating the financial state of a construction firm, the ratios categorised above can be expressed as follows:

- **Profitability:**

A construction company must make enough profits for its growth and survival. Profit is the difference between the company's income and its expenses. In order to assess if
a construction company is trading profitably, only profits generated from its normal operations should be taken into account. The following profitability ratio, when viewed over a number of successive years, should provide a better insight into the position of the company:

ROI (Return on investment)

\[
\text{ROI} = \frac{\text{trading profits (after taxation)}}{\text{total assets less investments in related companies}}
\]

- **Liquidity:**

A construction company, or indeed any company, should ensure that it does not suffer from lack of liquidity. Sufficient liquidity is essential for a company to pay its way as a profitable business could be brought to a halt through insufficient liquid funds.

The current assets need to be well in excess of the current liabilities in order to finance the level of activity required by management. Current assets are defined as cash, work in progress, inventories valued at lower end of market value, marketable securities, and receivables payable on demand or within 12 months, less an adequate provision for bad debts. Current liabilities are usually liabilities payable on demand or within 12 months.

It must be stated, however, that when liquidity becomes greater than is necessary the company loses profit. Liquidity must therefore be reasonably balanced. The ratio of current assets to current liabilities, or current ratio, tests whether the borrower has sufficient liquid resources to pay its current debts without having to resort to capital sales. The ideal ratio is 2:1 but construction companies trade with far less than that. The construction firm’s high dependence on short-term credit results in a realistic current ratio of 1.5:1. A ratio lower than 1.5:1 should be viewed as an indicator of future solvency problems.

Current ratio:

\[
\frac{\text{current assets}}{\text{current liabilities}}
\]

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The quick ratio or acid test is a more severe test of a firm’s solvency. Whereas the current ratio includes inventory in determining assets, they are excluded in determining quick assets.

Quick ratio (acid test ratio):

\[
\text{current assets less inventory} \quad \frac{\text{current liabilities}}{} 
\]

The quick ratio is the liquidity ratio that compares the cash, debtors and other liquid assets immediately available for realisation, with the current liabilities. Inventories are excluded. The ‘rule of thumb’ for this ratio is 1.25:1 but slightly lower than that might be acceptable where the company is in a strong market position and able to take extended credit from its suppliers. A ratio lower than 1:1 should be viewed with alarm and requires further investigation.

- **Financial strength:**

  Gearing (leverage) ratios:

  The gearing ratios indicate the proportion of debt in the total financing of the company’s assets. They clarify the extent to which the assets have been financed by the incurring of debt. There should be a proper and valid mixing of debt and owners’ equity in financing the company’s total assets. The gearing ratios are very important as they reveal the actual character of the company’s capital structure. The best known rule of thumb for determining the amount of funds which can be raised from loans is the ratio:

  \[
  \frac{\text{total long-term debt}}{\text{total assets}} 
  \]

  A ratio of 1:2 is generally accepted as normal.

Debt-equity ratio:

\[
\frac{\text{Long-term loans raised}}{\text{Total shareholders’ funds}} 
\]
This ratio is a comparison between debt and equity. A company enhances the possibility of getting more profit by widening its base and operations with the help of borrowed money. Normally the higher the ratio the better, but the risk is also greater. This ratio indicates the ultimate cushion of assets available to meet liabilities.

Cash flow ratios:
The use of cash flow ratios to ascertain the financial strength of a construction company is quite common. Lending banks will want statements of expected future cash flows and apply ratios based thereon. One such ratio is a 'loan collateral value'. This could be written in such a form that the outstanding loans at any one time are always less than 50 per cent of the discounted present value of the net cash flows from proven developed resources.

- Activity:
Activity ratios help evaluate the efficiency with which the company utilises its assets to ensure maximum profit without endangering liquidity. They are also known as 'turnover ratios' as they indicate the relationship between sales and assets. Thus the effectiveness of asset utilisation can be judged by the following basic formula:

\[
\text{Profit for the year} \quad \frac{\text{Fixed assets}}{} 
\]

The higher the ratio, the better for the company.

The above ratios should be characterised by the firm's size. This can enable comparisons between firms of similar size. Comparing the financial ratios of a construction firm with those of a firm many times bigger or smaller would be a meaningless analysis or misleading.

- Trend Analysis:
The usefulness of comparing financial ratios of different construction firms is limited as each firm has its own financial characteristics. A construction firm can also manipulate its financial ratios through transactions that are for this specific purpose.
For example, should a firm need to improve its short-term position of current assets versus current liabilities, it can issue long term debt and use the cash to reduce its current liabilities. Selling fixed assets such as plant will provide cash that in turn will improve the value of current ratio to be viewed by a potential creditor. A more useful evaluation of a construction company can be made by charting its financial ratios over a given time. This is known as ‘trend analysis’.

Trend analysis of financial ratios can lead to early detection of a deteriorating financial condition or a possible weakness in the overall financial structure of the company. Inspection of the various financial ratios that measure profitability, liquidity, financial strength, and activity over a period of five years can give a good indication of the company’s financial position. A continuing decrease, for example, of a firm’s current ratio should be viewed as an indicator of potential liquidity problems. Finally, many of the favourable or unfavourable financial results of the construction company do not happen suddenly. Analysis of financial statements and ratios from year to year can lead to early detection of future events.

3.4.10 Working capital minimum

This is a minimum figure for the borrower’s net current assets after deduction of its current liabilities. It identifies the company’s ability to meet its current payments. Lending banks become reluctant to bond a construction company when its working capital falls below a certain agreed level. This results in an eventual decrease in the construction company’s turnover.

3.4.11 Funding and interest calculations

In order to make a loan, a bank borrows matching funds from other banks in the market for on-lending. These funding deposits are taken for short terms such as 3, 6, or 12 months (interest periods). At the end of each interest period the bank pays back the underlying deposit and immediately re-borrows another deposit for a further period. The interest rate payable by the ultimate borrower will be a specified percentage known as the ‘margin’. It includes the gross profit and remuneration for the risk above the rate at which the bank borrows the underlying deposits from other
banks. In the London interbank market the rate is known as the London Interbank Offered Rate ‘LIBOR’. In Dubai it is called ‘DIBOR’. Hence the interest rate floats and is calculated by reference to the cost of funds to the bank in the market at the beginning of each interest period. That cost depends upon the credit of the lending Bank.

In practice, many banks fund loans out of their own pool of funds without going to the market. These credits are usually known as ‘roll-over’ credits. Although the bank rolls its underlying funding deposit over at the end of the agreed interest period, the borrower is not normally required to re-pay and re-borrow.

Banks require construction firms to provide security for loans except in certain agreed overdraft arrangements. As the bank is lending on a short-term basis, the required security normally takes the form of liquid assets such as receivables and inventories. Loans against receivables are flexible and provide a continuous source of funds. Repayments can be made to the anticipated cash flows of the borrowing firm. Banks stipulate minimum levels of net worth and working capital. They may also require personal guarantees and insurance on the lives of directors before extending credit.

A main source of short-term funds for many companies is the unsecured bank loan. This is often taken out under a bank line of credit which entitles the company to borrow up to an agreed limit.

Another form of loan is the revolving credit. This is an assured line of credit with an agreed tenure. Revolving credit agreements are usually more costly than short-term bank loans.

- **Effective rates of interest:**

With an overdraft and with many types of loan, the interest charge is based on the outstanding balance of the debt at particular points of time.
3.4.12 Syndication

Some construction projects are so large that no single financial institution would wish to be the sole lender for its execution. The desire to spread the risk has given rise to the syndicated loan agreement. This involves several banks each contributing to a proportion of the loan under the terms of a single loan agreement between the lending syndicate and the borrower. The syndicated loan is usually arranged through one managing bank, called the lead bank, authorised on behalf of the borrower to organise the loan. When part of the loan is called or interest needs to be collected, the managing bank has to collect and disperse the payment rapidly. It has to ensure that all the participating banks and the borrower are kept fully informed of the state of the loan. According to The Banker, (December 1993, p. 67) The National Westminster’s Treasury Operation’s Commercial Loans Unit contracted a software firm, Synchronicity, to build a bespoke database PC system called PC LAN which stores records on the loan. It produces rapid responses to calls from the borrower for all or part of the loan and, above all, is flexible to cope with innumerable options.

3.4.13 Mandate letter

The managing bank must first secure a mandate letter from the borrower setting out the outline terms of the loan and giving it authorisation to arrange the loan accordingly. The mandate should specify the amount, tenure, the interest rate and the governing law. It should also outline, in summary form, the proposed terms that are usual for the market.

Usually mandate letters are intended to be proposals without any legal commitment. The letter should expressly state that it does not create legally binding obligations. In English mandate letters, managers use the term ‘subject to contract’ to clear any uncertainties.

After obtaining the mandate, the lead manager then approaches other financial institutions to enlist their interest in the loan by issuing information memoranda about the borrower. Once the terms have been agreed, the lead manager then negotiates the
loan documentation with the borrower giving the other participants access and adequate time to review the loan documentation.

3.4.14 Subordination

In this transaction, the subordinated creditor agrees not to be paid until another creditor (the senior creditor) is paid in full. In the event of the borrower winding up, going into liquidation or dissolution, the senior creditors first shall be entitled to receive full payment, in cash or securities, of the senior debt before the subordinated creditors receive any payment in respect of the subordinated debt.

3.5 Application of information technology

Information Technology (IT) in the 1990's has increased integrated data management capabilities. This has had a profound impact on the development of project management technology in general and on financial management in particular.

Management consists of three fundamental operations:

- planning;
- decision making; and
- controlling.

Planning is an essential management tool for charting courses and sequence of actions that need to be taken to attain a desired objective.

Decision making is choosing one particular course of action from others available.

Controlling is to ensure that the course of action taken does not deviate from planned and for management to take corrective measures if necessary.

The role of financial management in a construction company concerns administration of the flow of funds through the company. Fund utilisation is both investment in fixed assets and working capital. The decision to make up the capital structure
through the optimising of proportions of equity and debt components, together with the determination of the dividend policy, is the principal financing decision of the company.

Fund generation, financing and investment decisions must be taken according to the company’s short and long-term financial objectives.

The short-term financial objectives of a construction company differ from its long-term ones. The avoidance of insolvency by provision of liquidity to meet creditors, and optimal deployment of cash surpluses are examples of short-term financial management goals. These short-term goals can only be achieved through the constant monitoring of the company’s liabilities. A computer based information retrieval system is well suited to this task as it is a straightforward matter to arrange the list of liabilities according to planned repayment dates. A facility can be incorporated in the system whereby creditors can be classified in different categories to allow the postponement of certain non-statutory creditors if needed.

The long-term financial objective of a construction company is the maximisation of share-holders'/owners’ wealth. The weighted average cost of capital is an indicator of the company’s required performance. It is, therefore, management’s duty to ensure that any project’s yield exceeds the weighted average cost of capital in order to help in enhancing the equity value of the company.

3.5.1 Cash flow modelling
Cash flow modelling is used to assist in the financial management of current assets and current liabilities and therefore to control the company’s exposure to insolvency. Cash flow models are best implemented by the use of two models; one for capturing data into the computer and another for plan formulation with automated transfer of data from the former to the latter. Once the financing plan has been formulated to meet liquidity needs, it is possible to use the model to gauge insolvency or liquidity crisis. The total of all cash flows associated with all projects undertaken by the
company can also be calculated using the weighted average cost of capital as discount rate. This gives an indication of the company's future performance.

3.6 Summary

Project financing is not a new concept as was demonstrated in the financing of the great railway and canal construction of the nineteenth century. The sources of credit for project finance are limited to banks, institutional lenders, export credit and international agencies. Lenders look for certain qualities that must be met by the borrower before a commitment is made.

Security of the loan lies in the technical capability of the borrower to perform but the lender must have a right of recourse as a safety net.
CHAPTER FOUR

ESTIMATING AND CONSTRUCTION PLANNING
4.1 Introduction

The majority of construction contracts are won through competitive tendering. Tendering for civil and building engineering contracts is often restricted to certain contractors that are suitably qualified. Tender lists are usually very selective and contractors will have worked hard to have their names put on them. Tenders are therefore rarely declined. Lending banks appear to be concerned with the process as fourteen out of a total of twenty banks which answered the questionnaire confirmed that they investigated the tender make-up of the project before extending finance facilities. All bankers interviewed confirmed they looked at the tender results to see how close their customer is to the competition.

The tender total is made up of the cost estimate and an allowance known as the ‘mark-up’. There is a strong link between preparing an estimate for a construction project and its planning. The selection of labour and plant resources, and estimating the time required for the deployment of these resources, determines the parameters of the pretender construction programme. A construction firm seeking Project Related Finance facilities for a proposed project for which it is tendering approaches its bank at an early stage for the necessary bonding facilities to start with. Once a bid bond is issued, the lending bank is obliged to proceed with financing the execution of the project if and when awarded because the bond would be called if the contractor fails due to the bank’s default. The research has found that lending banks which finance construction contractors on a project-by-project basis resort to certain measures to overcome the various problems of risks that are generally associated with the funding of these contractors. The two most important measures lending banks employ to help them in overcoming the risks involved are:

- to be more selective through issuing bid bonds only to financially sound and technically capable contractors at the bidding stage; and
• to examine the tender make-up and the construction programme of the project for adequacy after award.

4.2 The cost estimate

A successful tender is one whose value is low enough to win the contract and high enough to enable the contractor to carry out the works and make some profit. Since 95 per cent or more of any tender's value is represented by the estimated costs, it is safe to conclude that the accuracy of the cost estimate is the most important factor in determining the success or failure of a tender.

The cost estimate is made up of two items:

- **Direct costs.** These are the materials, labour, plant and sub-contractor costs that are needed to execute the works. They must also include allowances for material wastage, plant idle time, and all temporary works and falsework.

- **On-costs.** These are costs attributed to a contract. They include site staff, site office costs, bonds, insurance policies and welfare.

An allowance for company overheads, risk, profit and finance charges is added to the cost estimate to make up the tender total or the contractor's 'selling price'. This allowance is known as the 'mark-up'.

The estimating and tendering process is a complex one that starts with the initial appraisal of the project and ends with the completed submission. It involves the contractor's staff as well as personnel from outside the company. Material suppliers, plant hire companies and sub-contractors all contribute to determining the cost estimate. The main activities that take place in preparing a tender for a typical civil engineering project can be listed as follows:

- Appraisal of the project.
- Appraisal of conditions of contract, financial requirements and an assessment of risk or opportunity.
- Material quantities are abstracted from the tender documents and prices are obtained from suppliers.
• Details of work to be sub-contracted are compiled together with relevant extracts from tender documents, and quotations are obtained from sub-contractors.
• The site of the works is visited and information regarding local conditions that might affect the execution of the contract obtained.
• A programme and a method statement for the execution of the works is prepared.
• List of plant required, false work requirements, unmeasured work and details of supervisory staff is drawn up.
• Details of any design work that must be done by the contractor to be taken off for costing.
• Quantities of major items in the tender documents are checked.
• The cost estimate is worked out.
• Management reviews the estimate, evaluates the risks and adds the appropriate mark up.
• The form of tender is completed ready for submission.

Collecting and calculating cost data for the purpose of estimating a construction project can be laborious and time consuming. Civil engineering contracting organisations have been upgrading their estimating capabilities by the introduction of computer-aided estimating (CAE) systems. According to a survey by Oteifa and Baldwin (1991), data gathered from a large sample of contractors (all members of the Federation of Civil Engineering Contractors, UK) revealed that a total average of 56 per cent used a CAE system. Broken-down into company size this represents 81 per cent of the large-sized, 62 per cent of the medium-sized and 16 per cent of the small-sized companies. The survey also found that except for calculating labour and plant costs, and the analysis of resource requirements, CAE systems have, in the main, failed to assist estimators in an effective way to improve their performance. It concluded that the estimator’s experience and expertise is the single most important factor in the production of any accurate estimate.
The contractor must manage the estimating and tendering process carefully so as to win contracts that are adequately priced. Some contractors, due to certain market conditions, find themselves compelled to tender with an exceedingly low mark-up. It is, therefore, in the lending bank’s interest to examine the tender to ensure the adequacy of the contractor’s selling price before any financial commitments are made.

4.3 The evaluation of project cost estimate

Project cost estimating and tendering is one of the most important activities in a contractor’s organisation as it can make or break the business. Banks investigating the viability of a tender before any financial commitments are made should gather information covering the following:

- the size of the tender list and tender results;
- the break down of tender;
- the identity of the Employer and the professional consultants;
- the execution programme and projected cash flow;
- the adequacy of the tender documents;
- the methods of payment and conditions of contract;
- the selection of sub-contractors;
- the availability and cost of resources and whether there are any restrictions to the entry of foreign labour;
- average salaries of technical and other construction staff;
- average daily rates of labour;
- road accessibility and site conditions;
- requirement of temporary facilities and utilities;
- import duty and restrictions, if any, on construction equipment;
- availability of construction equipment in the local hire market;
- availability of housing camps for expatriate staff and labour;
- past and anticipated cost escalation;
- regulations, if any, affecting the transferability of currencies;
- port facilities and general transportation conditions;
- legal information; and
- laws and regulations concerning taxes, duties, and licences, etc.

All the above information is to be gathered by the bank’s engineer and should be cross checked with the contractor in order to produce a Project Analysis Report certifying that financing the execution of the project is a sound venture. A proposal can then be made by the credit officer taking into account the other matters that need to be investigated.

4.4 Planning

Planning of a construction project is an important management function that requires skills in time scheduling and resourcing. The completion date of a construction contract is always imposed on the Contractor regardless of work content or difficulties and must not be exceeded. It is in the Contractor’s, as well as the Employers, interest to complete the project in the shortest time possible because time is money. Projects which are sluggish in their progress tend to attract higher costs.

Project planning entails defining activities necessary to complete a project and determining the duration of each activity. Determining when activities are to be performed is governed by the technical relationship between activities and the resources available. If, for example, only one machine is available to a contractor to perform two different activities, then one activity must be completed before the second one is started. In practice the project-planning effort of the construction contractor varies from a very detailed computer-generated project plan using network analysis (Critical Path Method) for a complex project to a very simple bar chart (also known as Gantt Chart).

Time scales dictated by management’s desire for the estimates to be fitted into the available contract period, regardless of resources, will never be achieved. The ideal project plan is that which has been compiled by careful co-operation between the estimator and the planner and which still keeps to the original estimates. This could be done either by changing the sequence of activities around to shorten the overall result
or by introducing additional resources, or by doing both. Management is thus provided with a tool which clearly shows the current state of any project and can therefore take appropriate action where needed. Before deciding on a planning technique for a construction project management must ensure that the system:

- works technically;
- works economically; and
- gains general support for itself.

The degree of sophistication required of a system must be proportional to its needs. A simple bar chart showing the start and finish of the activities of a small project may be all that is needed. The bar chart helps the construction company plan and control a project. In addition, the bar chart can be used to assist in scheduling labour, material, plant, and cash.

A good planning tool in a repetitive situation, such as a housing contract, is the Line of Balance Method. It is possible by the application of this technique to produce a suitable programme reflecting the rhythm of a particular repetitive sequence and, at the same time, cause the minimum of wastage of resources.

In order to be able to show the interdependencies of all project activities the Critical Path Method must be employed. According to a survey conducted by Aouad and Price (1993, p.98) at Loughborough University for developing the specification for a CAD-based planning system:

"One of the most interesting findings of the survey was that 100% of US and 58% of UK respondents use CPM (critical path method) techniques for planning purposes. This illustrates the strength of CPM as a planning tool and contradicts several publications regarding the suitability of such methods for construction projects."

Like the bar chart model, a critical path method serves as the basis for preparing a cash-flow analysis for a project. It is far more sophisticated and it offers the user more applications than the bar chart. Network analysis involves performing a series of calculations on a CPM diagram. One set of calculations is determined from a forward
pass through the CPM network. This is also referred to as the *earliest start* schedule since the calculations performed give the earliest time that the project activities can possibly start and finish. The second set of calculations made on the CPM diagram is called the backward pass. This is also referred to as the *latest start* schedule since the calculations performed give the latest time activities can possibly start and finish without delaying the calculated minimum project completion time. CPM calculations are aimed at satisfying the following basic objectives.

- To determine the minimum project completion time.
- To outline which activities dictate the minimum project completion time. These are the critical activities forming the critical path through the CPM diagram.
- To calculate how much time each project activity can be delayed without affecting the minimum project completion time.

Completion time can be shortened by accelerating the activities. This acceleration adds to the costs as it represents such steps as overtime work, multiple shift operations, larger work force, and the use of more plant. Each activity has some practical time limit beyond which it cannot be shortened further. This is referred to as the *crash* time and the corresponding cost is the *crash cost*. By working out the crash time and cost for all activities, a point is obtained that represents the shortest possible project time and the highest possible cost.

Network analysis works well in the right situation both technically and economically. However in order to succeed, it must have the full backing of those involved in its implementation. Management must take into account that the introduction of new or unfamiliar methods will mean longer learning curves, and the time taken for the optimum point to be reached will vary proportionately with the complexity of the operation. It can only expect to obtain an effective level of competence after staff have become familiar with the work. The functions of project planning can be summarised as follows:

- to determine the critical path;
- to define activities;
• to gauge resources;
• to determine schedules;
• to define costs relative to schedules; and
• to interface.

4.5 Summary

The estimating and tendering process is the most important activity in the contractor’s business, followed immediately by planning. The contractor must manage this process very carefully in order to win contracts with an adequate margin. Lenders active in project related finance are known to investigate the tender make-up and execution programme of the project before extending finance (see Conclusions of the Research in Chapter 10).
CHAPTER 5  CONSTRUCTION CONTRACTS

5.1 Introduction

Construction contracts, like any other contracts, comprise of an offer and acceptance. The offer being the Contractor's selling price in the submitted tender document and the acceptance being the Employer's Letter of Acceptance and/or the signing of the Agreement.

The form of contract employed to achieve the objectives of the project largely depends upon the requirements of the Employer but it must also safeguard the interests of the contractor. Moreover, since construction contracts operate in ever changing environments, they must contain provisions to deal with changes without any need for modifications or amendments. The conditions of contract are crucial to the lender in contractor credit assessment.

5.2 Types of contract

A contract is needed to define precisely the relationship which exists between all parties involved directly or indirectly in a construction project, and to outline their respective duties and responsibilities. In accordance with general principles, the contract confirms the legal rights and obligations of the contracted parties. The contract document need not be elaborate. Stallworthy & Kharbanda (1985, p.64) stated that: "The complex contract creates a legal jungle full of pitfalls for the unwary". The contract document should first deal with the real substance of the contract which can be set out as follows:

- contract conditions;
- definitions;
- specifications;
- time scale;
- location;
- statement of work; and
price and method of payment.

As each construction project is a one-off entity and there are no two identical projects, there cannot be two identical contracts. Every contract is different but the contract conditions should all contain express clauses setting out clearly the actions to be taken by the contracted parties concerning the essence of the contract. They should ensure that all the terms are agreed before work commences. The right of a contractor to suspend or determine contract if payment was not made when due, for example, was debated with other contractual matters by Knowles, Construction Contracts Consultants, in the Gulf Construction Conference, Dubai (1993). The case of The Channel Tunnel Group-v-Balfour Beatty Construction Ltd. and Others (1992) was cited when the Court of Appeal held that under English Law, in the absence of an express clause in the contract, a contractor has no right to suspend work where the Employer refuses to make an interim payment in respect of part of the works. From this decision it can be seen that in the absence of express clauses in the contract, contractors and their lenders expose themselves to higher risks.

Contracts adopted in practice can be identified as follows.

5.2.1 Traditional contracting

In the traditional system, evolved in civil engineering in Britain and widely used in the UAE, the Employer employs a consulting engineer and bears the design risks, except where the engineer is proved to be negligent. The Contractor, who is usually selected through competitive tendering, bears the construction risks except those taken by subcontractors and suppliers. This system allows for competition between contractors giving the Employer the advantage of obtaining the lowest price. The lowest price offered may not, however, be the final price due to various reasons such as changes in design, escalation of primary costs and changes in the scope and quality of work. This is primarily due to the separation of the design responsibilities from those of construction.
Another form of traditional contracting is the lump sum contract. This can be employed to the benefit of both the Contractor and the Employer as it offers them the means to work to a fixed price. This system has been followed extensively in the public sector in the UAE especially in schemes with repetitive nature such as social housing and schools where design changes are virtually non-existent. The Department of Social Services and Buildings of Abu Dhabi also uses the lump sum form.

5.2.2 Design-and-construct contracting
An alternative to the traditional form of contracting in civil engineering is that a contractor performs both design and construction of the project. The advantages of this type of contract are the combining of the design and construction responsibilities, hence avoiding extra costs associated with design changes.

5.2.3 Management contracting
Under this form the management contractor is employed by the Employer to plan, define, supervise and direct the work of other contractors on the Employer's behalf. The management contractor is able to offer the Employer a professional team with contracting and construction expertise to execute the project.

5.2.4 Direct labour contracting
The employers perform out their own planning and designs and tender for labour only. Municipal authorities use this form of contracting.

5.2.5 Build-Operate-Transfer (BOT) contracting
Under the BOT form, the contractor is the leader in initiating the project, finding the finance, building the project, operating and then transferring back the completed project. This generally refers to large infrastructure and energy projects that are normally state owned but can also be used in the private sector. The concept of BOT came into being due to "the volume of major construction project activity declining drastically from 1982 on" (Morris 1994, p.170). On the national scale, the construction industry in the UK has suffered a great deal in recent years. By 1993, construction output was still some 39 per cent below its 1990 level (source: CSO 1994), and, contractors had to take drastic measures in order to survive. These
measures resulted in huge reductions in staff, and also in rethinking in business strategy. Contractors began to realise that they could generate work by initiating and funding a project instead of waiting for a client to put works out to tender leading to the build-operate-transfer form of project.

The following six inter-related elements must be identified and dealt with carefully in order to successfully complete a BOT scheme.

- **The special purpose vehicle or concessionary company.** The initiators of the BOT scheme should form a Special Purpose Company "SPC" to execute the project. The SPC should not have any assets or liabilities other than those related to the project. The Contractor can be a share holder in the SPC. The rights and obligations of the share holders must be set out clearly in the share holders’ agreement.

- **The concession agreement.** This is the key element in any BOT contract which is usually negotiated directly between the government authority concerned and the sponsors. It essentially allows the sponsors to undertake the project and concedes certain benefits to them such as the right to levy charges so that they recover their investment with profit.

- **Government legislation.** The BOT scheme must be supported by legislation and the government must be fully committed to it. Legislation must be in place to protect lenders and to enable sponsors to reap the desired benefits.

- **The construction contract.** This is normally a design-and-construct contract with a requirement that it be a “turn-key” contract.

- **Project financing.** BOT project financing is based on limited recourse financing, lender’s recourse being limited to the project and the revenue generated by it. It is, however, inaccurate to assume that there will be no credit support from the sponsors or any other party involved in the project. The construction company which is almost always a major sponsor of the project, gives credit support through the fixed price turn-key contract and the provision of completion guarantees and performance bonds.

- **The operating contract.** This is the final element of a BOT scheme which deals with the application of income produced when operating the completed
project in accordance with the financing arrangements. The operating contract will come to an end at the expiry of the concession period when the “transfer” takes place.

BOT contracting was discussed in detail at the Project Finance’95 conference, Abu Dhabi. Al Manah Power Station in Oman, built under BOT, was presented as a case study by Mr. Michel of Tractabel Electronics & Gas Company, the Belgian sponsors of the project. A Special Purpose Company was established under the name United Power Company to execute the scheme with the Tractebel Group and four Omani enterprises as Joint Venture sponsors. Financing is limited recourse project financing. The power purchaser is the Ministry of Electricity and Water (Oman), and the project is seen as part of the privatisation efforts of the Omani government. The agreement dated June 27, 1994 was ratified between the Government of the Sultanate of Oman, represented by MEW, and the United Power Company. The agreement defines the general frame and the relationship of the two parties with respect to implementation of the project including concession rights, sovereign guarantees to UPC, UPC formation and land rights. The construction contract period is twenty two months, and the operating contract duration is twenty years.

5.3 Conditions of contract

Construction contracts are made with certain standard conditions that are necessary for the proper execution of projects. They must also satisfy the commercial objectives of the contractors who look towards maximising profit, minimising risk, and optimising cash flow.

Conditions of contract literature identify the primary clauses in any constructional contract as follows.

- Duties and power of the Engineer;
- Definition of contract documents;
- Superintendence to be provided by the Contractor;
- Limitations on assignment and sub-letting;
- Responsibility for setting out the Works;


- Contractor’s liability to indemnify the Employer for damages to persons and property;
- Insurances;
- Notices and fees;
- Damage to highways and bridges;
- Watching and lighting;
- Testing and substantiation of quality of material and workmanship;
- Removal of defective work;
- Completion certificate, time for completion, and defects liability period;
- Engineer’s instructions;
- Bills of quantities, variations, day works, and valuation of completed work;
- Ownership of unfixed material and plant;
- Provisional and prime cost sums and nominated sub-contractors;
- Certificates, payments, and retention;
- Delays, extension of time and liquidated damages;
- Determination of contract;
- Frustration; and
- Arbitration procedure.

Further clauses are sometimes added to suit the type of contract selected.

5.3.1 Model conditions of contract

Various model conditions of contract have been devised for the execution of civil engineering work, building work, mechanical, electrical and process engineering work. The drafting and updating of these models is performed by professional engineering institutions and government agencies in consultation with other interested parties.

The following forms or adaptations thereof are commonly used in construction contracts:

of Consulting Engineers and the Federation of Civil Engineering Contractors, UK.

- *Conditions of Contract (International) for Works of Civil Engineering Construction*, published by Fédération Internationale des Ingénieurs Conseils (FIDIC), Switzerland.
- *Standard Form of Building Contract*, published by the Joint Contracts Tribunal (JCT), UK.
- *Standard Form of Management Contract*, published by the Building Employers Confederation for the JCT, UK.
- *Form of Sub-contract for use in conjunction with the ICE Conditions of Contract*, published by the Federation of Civil Engineering Contractors (FCEC), London.
- *General Conditions of Government Contracts for Building and Civil Engineering Work (GC/Works/1)*, UK.
- *The New Engineering Contract (NEC)* recently published (1993) by the Institution of Civil Engineers and is now in use in the UK.

Some attempts have been made in the Gulf Co-operation Council Countries to adapt these forms by deleting or altering certain clauses to suit their own conditions. The following conditions of contract are in use at present in the UAE:

5.4 Differences in international and local conditions of contract

To satisfy the basic principles of construction contracting in order to attain the desired commercial objectives, the content and purpose of each phrase in the contract document must be clear. A clear contract helps to establish clear procedures in the various stages of the execution of the project. It minimises disputes and subsequent claims arising from the varying interpretations among the parties concerned.

There is no legal requirement for structuring a contract as every contract is different, but construction contracts used in practice must contain the seven basic elements as set out in 5.2. A suitable form of contract should be chosen to achieve the objectives of the project depending upon the requirements of the project’s promoter. In international contracting, some countries limit the powers of the Engineer by introducing certain clauses limiting what can be negotiated. It is argued that the ICE Conditions of Contract and the FIDIC Contract Conditions were basically written to the advantage of a group of contractors and consultants. The contract, therefore, gave favourable conditions to the Contractor and wide-ranging powers to the Engineer. The New Engineering Contract (NEC), however, is a more straightforward contract that has been gaining popularity since its launch in 1993. In Europe and the UK the financial ability and standing of the Employer is of concern. It is the opposite in the UAE as the Contractor’s ability and performance is in question. The comparison given below illustrates the major differences between the FIDIC and ICE on the one hand, and the Government of Abu Dhabi General Contract Conditions (A.D.G.C.C.) and Dubai Municipality Conditions of Contract (D.M.C.C.) on the other.
5.4.1 Adverse physical conditions and artificial obstructions:

Clause 12 of the FIDIC entitles the Contractor to give written notice to the Engineer and receive additional reasonable costs for dealing with physical conditions, other than climatic conditions, or artificial obstructions which could not have been reasonably foreseen by an experienced contractor.

Clause 12 of the ICE Conditions of Contract places the responsibility for unforeseen physical conditions and artificial obstructions upon the Employer. It allows the Contractor to give the Engineer written notice of his intention to claim for additional payment or extension of time arising from encountering physical conditions (other than weather conditions or conditions due to weather conditions) which could not reasonably have been foreseen by an experienced contractor. The Engineer may if he thinks fit:

a) require the Contractor to submit cost and timing;
b) give written consent;
c) give written instructions dealing with the conditions;
d) order a suspension or a variation order.

Article 24 of A.D.G.C.C. allows neither payment nor extension of time for such an occurrence. The risk is therefore transferred from the Employer to the Contractor who should allow for such a risk.

Sub-Clause 12.2 of D.M.C.C. allows the Contractor to give notice to the Engineer, with a copy to the Employer, in the event of encountering adverse physical obstructions or conditions. This does not include climatic conditions which, in the Contractor's opinion, are not foreseeable by an experienced contractor on site. The Engineer may:

a) ask the Contractor to provide a cost estimate;
b) approve in writing the necessary measures;
c) give written instructions of how to deal with the physical conditions or obstructions;
d) order a suspension or give a variation order.
It is to be noted that under Sub-Clause 2.1 the Engineer's powers to give variation orders are limited.

5.4.2 Work to the satisfaction of the Engineer:

Compliance with the Engineer's instructions according to Clause 13 of FIDIC which states that the Contractor shall comply with the Engineer's instructions and directions provided they are legally or physically possible. This applies to any matter, whether mentioned in the contract or not, touching or concerning the Works.

Clause 13 of the ICE Conditions of Contract stipulates that the Contractor shall construct and complete the Works to the satisfaction of the Engineer. It further states that the Contractor shall comply with and adhere to the Engineer's instructions on any matter connected therewith apart from where it is legally or physically impossible.

Article 18 (2) of A.D.G.C.C. states that the Contractor must implement and follow accurately and without delay the instructions issued by the Engineer. No reference is made to "as far as they are legally or physically possible" and "touching or concerning the Works". This implies that the Contractor may receive and carry out the Engineer's instructions on matters outside the scope of the Works.

D.M.C.C. Sub-Clause 13.1 (Work to be in Accordance with Contract) states that unless it is legally or physically impossible, the Contractor shall execute the Works to the satisfaction of the Engineer. The Contractor should adhere to the Engineer's instructions on any matter, whether mentioned in the contract or not, which is touching or concerning the Works. The Contractor shall take instructions from the Engineer subject to the provisions of Clause 2 whereby the Engineer must obtain the Employer's prior approval in:

a) instructing work to be carried out that is in addition to, or a deduction from, the effective contract price;

b) issuing instructions for the expenditure of provisional sums or for major items of material;
c) instructing work under a contingency sum;
d) requiring tests to be conducted outside the UAE;
e) consenting to the Contractor's programme;
f) issuing a Taking-Over Certificate; and
g) issuing a Defects Liability Certificate.

5.4.3 Programme to be furnished:

According to FIDIC clause 14 the Contractor is to submit a programme of the Works to the Engineer for approval within a period specified in Part II of the conditions.

If the Engineer finds that the Contractor is not progressing according to the approved programme, the Contractor must produce a revised programme to complete the Works within the contract period as stated in clause 43.

ICE Conditions of Contract Clause 14 requires the Contractor, within 21 days after the award of the Contract, to submit a programme showing the order in which the contractor proposes to carry out the Works to the Engineer for the latter's acceptance. The Engineer is entitled to accept or reject it, or may request the Contractor to supply further information. If it appears to the Engineer at any time that the progress of the work does not conform with the programme, the Engineer shall then be entitled to require the Contractor to produce a revised programme to ensure completion of the Works within the prescribed completion time.

Article 17 of A.D.G.C.C. states that programme approval is granted by the Governmental Department concerned (the Employer not the Engineer). The Department can if it wishes make changes that it sees necessary to the programme and the Contractor must comply with such changes without compensation. Thus the Employer who is a party to the Contract has the right to change the other party's (the Contractor) sequence of operations.

Sub-Clause 14.1 of D.M.C.C. states that prior to the signing of the contract, but not later than 28 days after the date of Letter of Acceptance, the Contractor shall submit a
programme to the Engineer with a copy to the Employer, for their consent. The programme should contain:

a) the order of implementing the Works;
b) the time limits for submissions and approvals;
c) method statement; and
d) details of the resources required.

The Contractor shall not commence work until 14 days after the submission of the programme. The Engineer, under Sub-Clause 2.1, shall seek the approval of the Employer prior to consenting to the Contractor’s programme.

5.4.4 Contractor’s superintendence and employees:

Clauses 15 and 16 of FIDIC state that it is the Engineer who approves the Contractor’s agent and personnel and has the right to have them replaced. The Engineer also issues instructions to the Contractor’s approved agent under the various contract clauses.

Under Clause 15 (1) and (2), and Clause 16 of ICE Conditions of Contract, the Contractor shall provide all necessary superintendence and a competent and authorised agent who shall receive instructions from the Engineer. The Engineer shall be at liberty to object to, and require the removal from the Works, any person employed thereon.

By contrast, under Article 30 of the A.D.G.C.C., it is the ‘Department’ represented by its Engineer that has these rights. This implies that one party to the Contract may unilaterally affect the second party’s actions without reference to the impartial functions of the Engineer.

Under Sub-Clauses 15.1 and 15.2 of the D.M.C.C., the Engineer’s approval is required for the appointment of the Contractor’s authorised representative who should be fluent in both English and Arabic. Under Sub-Clause 16.1 the Contractor shall provide competent employees for the execution and completion of the Works, and a
competent person, fluent in English, to be at the service of the Engineer during all working hours. Under Sub-Clause 16.2 the Engineer is at liberty to require the removal from the Works any person the Engineer considers incompetent or undesirable.

5.4.5 Setting out:

According to Clause 17 of FIDIC, the cost of rectification of setting-out mistakes resulting from information supplied in writing by the Engineer is to be paid by the Employer.

Under Sub-Clause 17 (2) of ICE Conditions of Contract any error in setting out is to be rectified by the Contractor at his own cost. If such an error is based on incorrect data supplied by the Engineer, the cost shall be borne by the Employer.

The A.D.G.C.C. Article 20 puts the responsibility for setting out of the Works, its accuracy, checking the dimensions and levels shown on the drawings and designs and for the accuracy of data contained therein solely on the Contractor. Furthermore the Contractor shall rectify any error that may have been made by the Engineer. All risk resulting from setting out is, therefore, transferred from the Employer to the Contractor who assumes full responsibility for any mistakes.

D.M.C.C. Sub-Clause 17.1 also puts all the responsibility for the setting-out of the Works on the Contractor. However, it allows the Engineer to determine an addition to the contract price in the event of a setting-out error based on incorrect data supplied in writing by the Engineer and in accordance with Clause 52 which allows for prior consultation with the Employer. It must also be noted that under Sub-Clause 2.1 (a) the Engineer shall obtain the Employer's prior approval before instructing work to be executed which is an addition to or a deduction from the effective contract price.

5.4.6 Care of the Works:

Under Clause 20 of FIDIC, the Contractor is responsible for the care of the Works up to the issue of a certificate of completion or partial completion. After that the duty of
care of the Works passes to the Employer. However, the Contractor is not responsible for any damage, loss or injury caused by certain ‘Special Risks’ listed under the same clause. These risks briefly relate to war, commotion or disorder, ionising radiations or contamination by radio activity, pressure waves caused by aircraft, forces of nature an experienced contractor could not foresee, the Engineer’s design of the Works, and use by the Employer of any part of the permanent Works.

Clause 20 of ICE conditions of contract states that responsibility for the care of the Works and materials, plant and equipment is on the Contractor from the commencement date until the date of issue of a Certificate of Substantial Completion for the whole or section or part of the Works when the responsibility for the care of that section or part shall pass to the Employer. Sub-Clause 20 (2) lists the ‘Excepted Risks’ for which the Contractor is not liable:

- the use or occupation of any part of the Works by the Employer;
- any fault in the design of the Works other than a design provided by the Contractor;
- war or hostilities;
- civil war or rebellion;
- ionising radiations or contamination by radio-activity; and
- pressure waves caused by aircraft.

The A.D.G.C.C. conditions put the responsibility for the care of the Works on the Contractor and there is no reference to any special risks definition clause.

The D.M.C.C. Sub-Clause 20.1 states that the Contractor is to take full responsibility for the care of the Works from the commencement date until the Taking-Over Certificate date. Sub-Clause 20.3 allows the Engineer to determine an addition to the contract price in accordance with Clause 52 in the event of any loss or damage happening from the Employer’s risks as defined in Sub-Clause 20.4 which briefly relate to:

- war;
- rebellion;
• ionising radiation or contamination by radio-activity;
• pressure waves caused by aircraft;
• use by the Employer of any part of the permanent Works;
• the Engineer's design of the Works;
• interference with right of way; and
• acts of government.

Sub-Clause 20.5, however, puts all other risks not stated in Sub-Clause 20.4 on the Contractor.

5.4.7 Insurance of the Works:
Clause 21 of the FIDIC contract requires the Contractor to insure the Works, except for the special risks as stated under Clause 20, up to the completion or partial completion certificate.

Under Clause 21 of the ICE Conditions of Contract, the Contractor is required to insure in the joint names of the Contractor and the Employer the Works together with materials plant and equipment to the full replacement cost plus 10 per cent except for the 'Excepted Risks' as defined in Sub-Clause 20 (2). According to Article 12 of the A.D.G.C.C., the Contractor is to insure against loss and damage arising out of fire, and other risks and damage. 'Other risks and damage' are indeterminate which means the Contractor bears risks which are unknown.

Under Sub-Clause 21.1 of D.M.C.C. the Contractor is to insure the Works together with materials and plant to their full replacement cost, plus an additional sum of 15 per cent, or as may be specified in the Appendix to the Form of Tender. There are exclusions, as defined in Sub-Clause 21.4, which relate to war, rebellions, radiations, pressure waves caused by aircraft, riot and commotion.

5.4.8 Damage to persons and property:
Clause 22 of the FIDIC requires the Contractor to indemnify the Employer against all losses and claims in respect of injuries or damages to any person or material or
property arising from the execution of the Works. The following are exclusions where the Employer indemnifies the Contractor.

a) The permanent use or occupation of land by the Works or any part thereof.

b) The right of the Employer to execute the Works or any part thereof.

c) Unavoidable injuries or damage to persons or property resulting from the execution or maintenance of the Works.

d) Injuries or damage to persons or property resulting from any act or neglect from the Employer.

Under Clause 22 of the ICE Conditions of Contract, the Contractor shall indemnify the Employer against all losses and claims in respect of death or injury to any person, or loss or damage to any property, arising out of the execution of the Works. There are exceptions, as stated in Sub-Clause 22 (2), which relate to damage to crops on site, use or occupation of land or interference of right of way, damage which is the unavoidable result of construction, and death or injury resulting from the Employer’s negligence. Sub-Clause 22 (3) provides for indemnity by the Employer.

According to Article 13 of the A.D.G.C.C. the total risk is borne by the Contractor without any exceptions.

The D.M.C.C. Clause 22 covers damage to persons and property, with exceptions and provisions for indemnity by the Employer, in a similar manner to those of the ICE Conditions of Contract.

**5.4.9 Special loads and extraordinary traffic:**

Clause 30 of the FIDIC requires the Contractor to avoid, as far as reasonably possible, causing unnecessary damage to highways and bridges. However, under Sub-Clause 30 (2), the costs of strengthening roads or bridges to carry special loads or extraordinary traffic are to be paid by the Employer.

Clause 30 of the ICE Conditions of Contract requires the Contractor to use every reasonable means to prevent any of the highways or bridges communicating with or
on the routes to the site from being unnecessarily damaged. The Contractor is to indemnify the Employer against all claims for damage to any highway or bridge due to transport of Contractor's equipment. The Employer, however, is required, according to Sub-Clause 30(3), to negotiate the settlement of and pay all sums due for damage caused through the transport of materials unless such damage is in the opinion of the Engineer is caused by the failure of the Contractor to perform his duties as stipulated in the Clause.

Under A.D.G.C.C. Article (34), the Contractor should use every reasonable means to prevent damage to any highways or bridges linking with or on the route to the site. Should it be found necessary for the Contractor to move loads of constructional plant, machinery or preconstructed units over part of a highway or bridge, and the moving of the same is likely to cause damage, then the Contractor should give notice to the Engineer of the weight and other particulars of the load to be moved and his proposals for protecting and strengthening of the said highway or bridge. If the Contractor does not receive instructions from the Engineer within 14 days from the date of the notice, then the Contractor should carry out his proposals and the costs will be paid by the Employer. If during the execution of the Works or at any time thereafter, the Employer receives any claim regarding damage to highways or bridges, the Contractor should settle such claims and pay the amounts due without having any right to put up a claim with the Employer.

D.M.C.C. Sub-Clause 30.1 requires the Contractor to use every reasonable means to prevent any of the roads or bridges communicating with or on the routes to the site from being damaged or injured by any of the Contractor's traffic. The Contractor is to indemnify, and keep indemnified, the Employer against damage to any road or bridge caused by the transport of Contractor's equipment. If damage occurs to any bridge or road arising from the transport of materials, the Contractor is to notify the Engineer with a copy to the Employer. The Engineer, after due consultation with the Employer and the Contractor, is to determine the amount.
5.4.10 Default of the Employer:

FIDIC Conditions Clause 69 permits the Contractor to terminate employment due to the Employer’s default by giving fourteen days notice to the Employer with a copy to the Engineer. The main areas of default are the non-payment of moneys within 30 days of the date payment is due, interference or refusal to approve issue of payment certificates, Employer’s bankruptcy, and formal notice from the Employer of being unable to meet contractual obligations.

Upon the expiry of the fourteen days’ notice the Contractor is entitled to remove all of his plant from the site. In the event of such termination the Employer will still be under the same obligations to the Contractor with regard to payment and must compensate the Contractor for any loss or damage arising out of such termination.

Clause 60 of the ICE Conditions of Contract sets out the terms for Certificates and Payments. Under Sub-Clause 60 (7) the Employer shall pay to the Contractor interest compounded monthly for each day on which any payment is overdue at a rate 2 per cent per annum above the base lending rate. Clause 66 sets out the procedure for the settlement of disputes. Sub-Clause 66 (2) gives the Contractor the right to serve notice on the Engineer in writing. The Engineer shall then settle the dispute and give his decision in writing to both the Employer and the Contractor. The decision of the Engineer is final unless it is revised by an arbitrator.

Article 45 of the A.D.G.C.C. entitles only the Employer, not the Contractor, to terminate the contract. The Contractor could theoretically complete the Works without payment as he has no right to terminate. The Contractors’ rights are, however, mentioned in Article 46 ‘Settlement of Disputes’ which contains provision for arbitration.

D.M.C.C. Sub-Clause 69.1 allows the Contractor to give notice to the Employer if the latter fails to pay the amount due under any certificate of the Engineer within 60 days after the expiry of the 28 days required by the Engineer as stated in Sub-Clause 60.2.
Upon the expiry of the 60 days notice referred to in Sub-Clause 69.1, the Contractor should be allowed to remove from site all the equipment brought by him.

It is evident from the ten chosen areas for comparing FIDIC and ICE Conditions with A.D.G.C.C. and D.M.C.C. that major differences come to light which should be studied carefully and taken into consideration by international contractors and their lenders. The area that should give most concern is the role of the Engineer. It can be seen that the Engineer, under the A.D.G.C.C. and D.M.C.C., is only an adviser to the Employer and not an independent body.

According to Wearne (1989, p.6): “The important differences between the possible alternative types of contract for civil engineering projects are in how the risks of design and of construction are shared between promoter and contractor.”

5.5 Commencement of contract

It is the Engineer’s responsibility to give to the Contractor, in writing, the order to commence together with the Employer’s authority to occupy the site legally and physically. The order to commence gives a specific date from which the time for completion can be computed. This is a very important contractual requirement to help the Employer secure liquidated damages should the Contractor exceed the completion date. It also enables the Contractor to calculate the defects liability period.

5.6 The construction phase

The construction process is an assembly process that needs physical inputs of construction materials as well as other components. The construction phase represents the construction process within a prescribed period: namely the contract duration. It also represents the Employer’s full financial commitment, and the Contractor’s ability, or otherwise, to execute the project within its specified constraints. The Contractor’s management skills are crucial in the construction phase. Wherever there
has been indifferent performance in a construction project, at any stage or totally, it has been an immediate reaction to blame it on bad management.

Before the start of any construction activities on site, it is essential for the Contractor’s management to review the following items and ensure that they are taken care of.

- The basic contractual requirements of insurance, health and safety on site and fire regulations.
- Building permits and all necessary statutory approvals.
- A clearly defined site plan and areas of work including site establishment and lay-down areas.
- A workable construction programme.
- The status of detailed design and construction drawings.
- Whether the construction contract drawings were checked for buildability.
- The approvals for materials and drawings.
- A procurement plan and identification of long lead items.
- Whether the site is adequately staffed with managers who are clear about their functions and responsibilities.
- Defined interfaces with sub-contractors.
- Whether methods and the sequence of construction have been agreed with the consultants/management contractor.
- The procedure for Variation Orders and changes control.
- Cost control and progress reporting.
- Quality plan and procedures.

Some of the above items need to be examined in greater detail by the Project Manager and some key staff. They must yield a developed procurement strategy to suit the project, an assignment of construction work packages, and controls over labour, materials and plant. In certain contracts where the Employer’s team are responsible for procurement, the Contractor must provide a co-ordinator to ensure the smooth and uninterrupted running of that vital operation. The identification and placing of orders for long lead items must be given special attention. In certain international contracts,
the supplier's ability to meet the political, legal and security conditions imposed by
the 'project country' should be investigated. A co-ordinator's role also includes
setting up an expediting system for the supply of materials and equipment. Expediting
needs judgement and foresight so that no time is wasted chasing after non-critical
orders. An expediting system should be set up for three reasons:

- to anticipate problems before delays occur;
- to exert pressure where necessary and to ensure that schedules are worked to;
  and
- to provide forewarning of any changes to the execution programme so that
  action can be taken.

5.7 Best practice

The view of 'Best Practice' contracting stems from Total Quality Management
(TQM) widely acclaimed as the success story behind the Japanese phenomenal post-
war growth. Total Quality philosophy, which was introduced to Japan by the
Americans in the 1950s, can be outlined as follows:

- the company to focus on customer needs;
- to meet customer needs effectively;
- total commitment of all members of the team; and
- continuous improvement in performance.

The effect of TQM can be applied in the management of construction projects
through:

- moving towards more comprehensive schedule planning and control;
- risk management techniques being more widespread and applied on all
  projects; and
- contracting becoming less dependent upon short-term projects and developing
  into 'relationship contracting'.

"One result of the new approach to contracting will be to reinforce further the advantage of long term relationship contracting and multi-contract arrangements; this will often extend as far as "partnering". Greater attention will be given to the objectives of the contracting parties, the nature of the services each provides, the risks they bear, and the rewards they can reasonably expect."

Best practice contracting should, therefore, reflect the project objectives, the risks involved and the ability of the parties to bear these risks. Cost-plus contracts, for example, are not healthy because the Contractor is not at any risk and is guaranteed to recover all costs no matter what happens in the execution of the contract. Contracts where all the risks are put onto the Contractor who is incapable of bearing them, are also wrong. Firm price contracts that stipulate an agreed price at the outset, with a better assessment of risks, are the key to better contracting. This can be taken a step further by introducing the condition that if the contractor makes a saving, the benefits would be shared. The same principle applies to losses. These contracts provide maximum incentive for the contractor and minimum price for the Employer. Best practice literature states:

- complete accurate records from tender invitation through contract should be kept;
- better estimating practices with enough time should be given for preparation and evaluation of bids;
- bids should not be evaluated on price alone. The quality of the bid itself, the quality of the bidder's management team, the management team’s experience and the work load at the time are all important factors;
- more advanced risk analysis techniques should be used. Expert systems documenting practical knowledge of the likely source of construction risk and the consequence of combining risk factors are now being developed and will be used to express the uncertainty of the risk analysis;
- the Employer’s role should be defined more comprehensively elaborating on the functions that should be retained by the Employer’s project manager such as safety, environmental and social issues;
- there should be flexibility over the type of contract so that it can be changed during the course of a project;
there should be new cost control practices, systems analysis and contract performance evaluation;
there should be support for the Project Management function;
strong experienced people should lead;
long-term relations similar to the ‘partnering concept’ (pioneered by Japan’s automobile industry in the 1980s) should be established and encouraged with employers; and
there should be continuous improvement in productivity and performance.

The ultimate effect of ‘best practice’ on lenders extending project related finance to execute construction contracts is in keeping risk within confined and controllable limits. Risk is not restricted to the construction period only but extends to the defects liability maintenance period that normally runs for one year, and during the longer term contractual requirement structural guarantee period that can impose an obligation for 10 to 15 years. Cost of rectification increases in relation to progress during construction and can be prohibitive during the maintenance period when the project is in use. The later the problem is found the more expensive it is to put right.

Best practice contracting advocates changing the traditional adversarial attitudes of the parties involved in the construction process to that of partnership. In Constructing The Team - Final Report (1994), sponsored by the UK government, Sir Michael Latham outlines key recommendations to improve the productivity, research record and image of the construction industry as well as ways of reducing the adversarial nature of relationships between the contracted parties. Recommendations regarding partnering (page 62) and its effect between supplier and client, and between contractors and sub-contractor are put forward:

"Specific advice should be given to public authorities so that they can experiment with partnering arrangements where appropriate long-term relationships can be built up. But the partner must initially be sought through a competitive tendering process, and for a specific period of time. Any partnering arrangement should include mutually agreed and measurable targets for productivity improvements."
The report discusses the partnering theme further and suggests (page 87) that disputes can be avoided through the use of contracts that emphasise partnership:

"The best solution is to avoid disputes. If procedures relating to procurement and tendering are improved, the causes of conflict will be reduced. If a contract document is adopted which places the emphasis on teamwork and partnership to solve problems, that is another major step. The prepricing of variations is also important."

5.7.1 Application of best practice to Project Related Finance:

It is more beneficial for a contractor to gain the goodwill of a long-term customer than to make a substantial profit on one of its projects. A long-term relationship between contractor and employer enhances the continuous improvement process implicit to Total Quality Management (TQM). TQM is virtually impossible to achieve where the learning process has to be re-established time and time again. A stable workload and workforce are essential for a contractor to attempt to implement TQM. It is due to this reason that "partnering" came into being in the early 1980's as an effort to improve the relationships between all parties involved in construction. Partnering has recently received attention world-wide but has become most renowned in the US. Some of the major users of partnering in the US are DuPont/Fluor Daniel, Proctor and Gamble/Kellogg, and Union Carbide/Bechtel. Some major employers and contractors in the United Kingdom, such as Marks & Spencers and Bovis, have practised some form of co-operative association for a number of years, but partnering as such is still in its infancy. The National Economic Development Council report on partnering (1991,p.51) cited the Anglian Water/Biwater arrangement which began in April 1989 as a case for thought on the partnering theme. According to the report:

"The association is established by a memorandum of agreement which has a three year duration, and this provides for some work to be made available to Biwater each year."

The long term partnering approach that develops into "relationship contracting" gives extra comfort to lending banks when they consider extending Project Related Finance due to the following reasons:
• parties working together over sufficiently long periods gain confidence and improvement in value of services;
• inadequate bids are not a risk any more. They are no longer accepted as they are renegotiated with the employers with sufficient contingency allowances; and
• all risks (and benefits) are shared by both parties to the contract according to their abilities.

Another aspect of best practice is “continuous improvement” which is central to any quality organisation. Organisational commitment to continuous improvement will result in either small, gradual changes or breakthrough improvement or both. **Breakthrough** means a dramatic improvement in work process. It can occur in technology, in the way work is organised, or in the way people think. Although breakthroughs are important, they do not happen all the time. Improvement most often results from small continuous changes. The continuous improvement process can only be achieved when the construction company:

• applies a quality plan to every aspect of work;
• understand the long-term advantage of a cost-of-quality approach;
• encourage all improvements, big and small; and
• focus on prevention instead of rectifying faults.

The construction company that advocates continuous improvement in the running of its business is a well managed company. Management, financial and technical, come high on the list of priorities in Project Related Finance.

### 5.8 Construction control

Construction control is achieved through the combined efforts of the contractors’ construction teams, the site supervision teams, and the Employers’ project management. It is in the Contractor’s interest to ensure that the following controls are operational on their sites.
5.8.1 Communication controls

The effects of poor communications on a construction site can be extremely costly especially to the contractor. Standards of communication can be improved considerably through the following:

- all instructions are to be written and are to follow a set format;
- information exchanged informally between any of the contractor’s team members and the Engineer’s Representative should be brought formally to the attention of the Project Manager;
- there should be sufficient meetings with the right functions and trades represented. An agenda should be circulated beforehand and minutes should be taken;
- minutes should be concise and should include actions taken or required; and
- all reports must be timely, accurate, factual and distributed only to those who need them.

5.8.2 Quality control of materials

At the centre of this operation is the project’s quality plan and materials procurement plan. Within the procurement plan framework, supplier’s lists of all items are prepared. The contractor may be required to ask certain suppliers to prequalify for inclusion on the lists. Such prequalification should include evaluations of systems for quality assurance and control as well as technical evaluations. Once the supplier lists have been approved by the Engineer and the Employer, all materials purchases should be restricted to those chosen from the approved lists and only be changed with the approval of the Engineer and the Employer.

5.8.3 Cost control

Monitoring costs of production cannot be overemphasised. To be successful, a project has to yield some profit to the construction firm for its survival and growth. The competitive nature of modern construction projects, coupled with decreasing profit margins, compel contractors to give cost control systems serious thought and attention. Contractors exercise cost control over their projects in a variety of ways. According to Shawa (1992, p.41):
"A more realistic way of evaluating cost is to price the operations involved in the Works taking into consideration:

(i) Period of completion
(ii) Assessment of work and its complexity.

This approach would help to establish a contract by a set of operations or activities with their values related to time. The contractor could then quote a price based on definite activities to be completed within specified and agreed time period. These activities could be expressed as a network, and respective cost and value components could be incorporated. Having established the network, if the time of completion as anticipated is achieved within the planned costs, one has effectively controlled costs."

Although contractors’ cost control systems may differ in their application, they should all lead to a common goal: to monitor the project’s cost and provide guidance on the necessary control actions to be taken. Whether the systems used are network-based or limited to monthly profit and loss at valuations for their operation, the benefits must outweigh the costs of its implementation.

5.8.4 Quality control

Quality control and inspection is a fairly new requirement in the construction industry in Europe and is still being debated in the UAE. The most important item in this process is the project quality plan which relates to Quality Assurance. Quality Assurance can be defined as a management discipline concerned with anticipating problems and creating the attributes and controls which prevent problems arising. It can also be described as a systematic way of ensuring that organised activities happen in the way they are planned. The internationally recognised Quality Assurance standards are ISO 9000 and Euro-Norm (EN) 29000, as well as BS 5750. The requirements of these standards are identical. The company concerned must address specific Quality Assurance areas encompassing management responsibility, company quality policy, management organisation, job descriptions and the quality system which includes:

- quality policy;
- quality system;
- contract review;
- design control;
- document control;
- purchasing;
- client supplied product;
- product identification;
- process control;
- inspection and testing;
- non-conforming product;
- corrective action;
- handling and storage;
- quality records;
- internal quality audits;
- training;
- servicing; and
- statistical techniques.

All the above areas must be addressed within the quality system of the company before it can be considered to have achieved the aims of quality assurance.

Procurement and execution of the Works must follow the quality control plan and procedures. This function is usually carried out by a person within the project team, and often supported by contracted specialists. It involves improving the company’s efficiency and service to its clients. Quality Assurance is not a contractual requirement in the UAE where quality is still controlled by the Resident Engineer and the municipal authorities. It is, however, in the contractors’ interest to make their staff quality conscious by introducing quality control and inspection procedures, and giving the quality controller powers to demand corrective action where needed.

5.8.5 Project interfacing

Dinsmore (1990, p.118), stated that: “Interfacing is an important project management issue that must be addressed at the outset in order to deal with problems that lie at the boundaries of defined areas of responsibility.” There are three types of interfacing:

- personal;
• organisational; and
• systems.

Personal interfacing is related to human behaviour. Eliminating the barriers and closing the gaps between people who must interrelate to implement their duties is a good example of personal interfacing. Organisational interfacing is accomplished through people bridging gaps between the inevitable clashing management styles of the key persons in the organisation. Systems interfacing is the performance criteria required for sub-systems to integrate with the overall system. The correct handling of interfacing of systems depends upon people-oriented management.

The project management team must recognise the importance of interfacing the different types of activities and ensure full and complete co-ordination between the various trades.

5.8.6 Completion

Sarmet (1982, p.109) stated that:

"A partly completed project is not one which lenders can countenance, nor will lenders wish to contemplate having to provide further loan finance to fund cost overruns. The practice has therefore been for lenders to insist on firm completion covenants usually backed by specific agreed tests; and where there is any doubt about performance, there has been insistence on additional loan facilities being arranged in advance. A delay in completion may within limits be acceptable, depending on the type of finance, and the loan documentation may provide for an adjustment in the repayment schedule in that eventuality".

5.9 Completion and defects liability

It is very important for the Contractor to obtain a Certificate of Practical Completion for the following two reasons:

• to obtain the release of half the retention money; and
• to define the end of the construction period.
The latter is the more important where there is a delay in completion for which liquidated damages must be paid, or where a bonus is specified for early completion. It is also the start of the Defects Liability period when all defects and minor outstanding items as outlined by the Engineer must be put right as soon as practicable.

5.9.1 Practical completion

According to Powell-Smith & Sims (1990, p.155) "Nobody knows what practical completion means". FIDIC Conditions of Contract clause 48, however, stipulates that the Contractor may give notice to the Engineer or the Engineer’s Representative accompanied by an undertaking to finish any outstanding work during the Period of Maintenance for a Certificate of Completion which should be issued in respect of:

- the permanent Works for a section being completed or when a substantial part of the permanent Works has been completed to the satisfaction of the Engineer and/or used by the Employer; or
- where the whole of the Works being substantially completed and satisfactorily passed any final tests as may be required.

The Engineer shall, within twenty-one days of the date of delivery of such notice either issue to the Contractor, with a copy to the Employer, a Certificate of Completion stating the date on which, in his opinion, the Works were substantially completed or give instructions in writing specifying all the work that requires to be done by the Contractor before the issue of such Certificate.

Similarly, clause 48 of ICE Conditions of Contract states:

When the Contractor considers that:

(a) the whole of the Works or
(b) any section in respect of which a separate time for completion is provided in the Appendix to the Form of Tender

has been substantially completed and has satisfactorily passed any final test that may be prescribed by the Contract he may give notice in writing to that effect to the Engineer or to the Engineer’s Representative. Such notice shall be accompanied by an undertaking to finish any outstanding work as soon as practicable during the Defects
Correction Period. The Engineer shall within 21 days of the date of delivery of such notice either:

(a) issue to the Contractor (with a copy to the Employer) a Certificate of Substantial Completion stating the date on which in his opinion the Works were or the section was substantially completed; or

(b) give instructions in writing to the Contractor specifying all the work which requires to be done by the Contractor before the issue of such certificate.

The Joint Contracts Tribunal conditions of contract JCT 80 does not define 'practical completion'. Clause 17.1 however provides the following:

"When in the opinion of the Architect practical completion of the Works is achieved, he shall forthwith issue a Certificate to that effect and practical completion of the Works shall be deemed for all the purposes of the contract to have taken place on the day named in such Certificate".

Under A.D.G.C.C. Preliminary handover of the Works and clearance of the site Article (36) stipulates

1. On the completion of the Works and the removal from site of all the Contractor’s plant, surplus materials etc., the Contractor shall give notice to the department and he shall be advised of a date fixed for the inspection at which a minute of the preliminary handover shall be prepared and signed by representatives of both the department and the Contractor.

2. If the Contractor or his representative fails to attend on the prescribed date, the process of inspection shall go ahead and a minute prepared and signed by the representative of the department alone.

3. If during the inspection it appears that the Works have been satisfactorily carried out, the date of the Contractor’s notice informing the department of his readiness for the preliminary handover shall be considered as the date of completion of the Works and the date of commencement of the maintenance period.

4. If during the inspection it appears that the Works have not been satisfactorily completed, then the same shall be made into a written report and conveyed to the Contractor. The handover should be postponed until the work is completed in
conformity with the relevant conditions. The maintenance period is to commence from the date of the last inspection.

5. If it appears from the inspection that the part of the Works not yet completed would not obstruct the utilisation of the Works, then the preliminary handover shall take place. In that case, the value of the incomplete Works should be deducted from the Contractor’s dues provided that he completes such Works within a period of two months; otherwise the department may execute them at his expense and deduct all expenses incurred from the entitlements of the Contractor, without giving him any notice or going to court.

6. The department should retain the performance bond until the end of the maintenance period and realisation of final acceptance.

D.M.C.C. Conditions of Contract Sub-clauses 48.1, 48.2, 48.3 & 48.4 deal with ‘Taking-over Certificate’, ‘Taking over of Sections or Parts’, ‘Substantial Completion of Parts’, and ‘Surfaces Requiring Reinstatement’ respectively. The Employer takes an active role in the process as follows:

"The Employer will attend with the Engineer, or subject to the provisions of Clause 2, with the Engineer’s Representative, any Tests on Completion inspections prescribed by the contract for the whole of the Works or any section or part thereof. When the whole of the Works have been substantially completed and have satisfactorily passed any Tests on Completion prescribed by the Contract, the Contractor may give notice to that effect to the Engineer, with a copy to the Employer, accompanied by a written undertaking to finish with due expedition any outstanding work during the Defects Liability Period. Such notice and undertaking shall be deemed to be a request by the Contractor for the Engineer to issue a Taking-Over Certificate in respect of the Works. The Engineer shall, within 28 days of the date of delivery of such notice and after consultation with the Employer, either issue to the Contractor, with a copy to the Employer, a Taking-Over Certificate, stating the date on which in his opinion, the Works were substantially completed in accordance with the Contract, or give instructions in writing to the Contractor specifying all the work which, in the Engineer’s opinion, is required to be done by the Contractor before the issue of such Certificate".

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It transpires that practical or substantial completion means completion for the purposes of allowing the Employers to take possession of the Works and use them as intended.

5.10 Summary

Conditions of contract are written by official bodies to suit the types of contracts to be executed but are sometimes biased towards one party. The comparison made in this chapter between the most important clauses of some international and local conditions of contract revealed major differences. This puts pressure on lenders to be more involved in contractual arrangements and to be more aware of the risks associated with the Contract.

All parties to a project are at some risk whatever the contracts between them. However the choice of form of contract can help, or in some instances hinder, the project's completion.
CHAPTER SIX

RISK AND PROJECT RELATED FINANCE
CHAPTER 6 RISK AND PROJECT RELATED FINANCE

6.1 Introduction

There is a general consensus that there is a direct relationship between risk and reward: that more risk should yield a higher return. According to Marks, R.J. et al (1985, p. 56):

"Risk is inherent in all commercial transactions. The amount of risk accepted usually bears some relation to the profit expected. A decrease in the certainty of the conclusion will be generally balanced by an increase in the reward expected."

When dealing with company finance, those who ultimately bear the risk of projects undertaken are the ordinary shareholders in the company. To safeguard their right of recourse, lenders that give general limits to construction companies demand:

- a general fixed floating charge over the company’s assets; and/or
- parental guarantees.

Lenders’ exposure in Project Related Finance, on the other hand, can be related to the borrower’s performance in the particular project. It is therefore important for lenders to evaluate the borrower’s capability to perform in Project Related Finance situations. However, some form of recourse is necessary and a blanket lien on receivables and equipment is generally required.

6.2 Risks in construction

The greatest period of risk in any project financing is during the construction phase of the project. Therefore, all projects are supported during the construction phase by performance bonds or guarantees supplied by the contractor.
Guarantees are especially useful in Project Related Finance since such undertakings permit the shifting of specific risks to interested parties. Guarantees may be divided in five groups:

- **Suppliers guarantees.** A supplier may be motivated to provide a guarantee for some processing facilities to be constructed and operating in order to procure the market for its product.

- **Sellers guarantees.** A seller may have plant that is surplus to requirements with little prospect of selling it except to an under-capitalised company which the seller feels has good prospects. A guarantee by the seller may be necessary to enable the purchaser to obtain finance.

- **Users guarantees.** The user of a product of a potential project may be motivated to financially aid it or guarantee the debt required to finance it in order to get it built.

- **Contractors guarantees.** Contractors must provide bank guarantees where there are elements of risk. At the bidding stage, bid bonds must be enclosed with tenders. Performance guarantees must be given after award. Advance payments and retention release at completion are made only against bank guarantees.

- **Governments guarantees.** Government agencies with a stake in the project, but do not want to own or control the company may guarantee the loan.

**6.2.1 Identification of main areas of risk:**

The lending bank needs to be able to identify the various risks associated with the particular project it is financing. For instance it needs to identify:

- Estimate risk - whereby the contractor puts enough margin for overheads and profits;

- Completion risk - whereby the project can be completed and handed over by a certain period. This is usually the period of highest risk because of possible cost overruns, delays, labour difficulties, and technical problems, etc.;

- Resource risk - whereby the resources of the borrower are sufficient and of good quality;
- Operations risk - whereby raw materials and a competent labour force are available for the project;
- Market risk - the current state of the construction industry;
- Currency risk - especially where the currency of payment differs from the loan currency; and
- Political risk - whereby there is no risk of civil disorder and outright expropriations without compensation.

6.2.2 Sensitivity Analysis

Sensitivity analysis is used to test the effect of a change in the value of a single risky variable on the total value of the project. It provides answers to many ‘what if’ questions, such as ‘What happens to the cost if the interest rate is increased by one percent?’ or ‘What happens if the contract duration is decreased by one month?’.

According to Flanagan and Norman (1993, p. 143):

"Sensitivity analysis enables us to test which components of the project have the greatest impact upon the results, thus narrowing down the main variables to be considered. The technique is widely used because of its simplicity and ability to focus on particular estimates. It does not however actually evaluate risk, the decision maker must still assess the probability of an event occurring."

Downside scenarios according to the complexity of the project can be assumed. For example, in a project where imported materials from a certain overseas supplier constitute a high percentage of the material content of the project, an analysis can be performed to see:
- the effect on profit of a proportional increase/decrease in the rate of exchange of that country, by a forecast percentage, while holding all other costs constant;
- the effect on profit if the freight charges are increased by a forecast amount holding all other costs constant.

Sensitivity analysis, although not suitable for evaluating risk, is an excellent tool for assessing the probability of a risk occurring so that management can:
- allow for it in the selling price; or
- transfer it by making their bid conditional; or
• insure against it.

6.2.3 Evaluation of risks

All the risks which have been identified need to be reasonably evaluated. The significance of each of the risks depends upon the extent to which the losses therefrom affect the project.

Forecasting the effects requires consideration of three characteristics:

• How often the losses will happen;
• How severe they will be when they happen; and
• The ability to foresee their happening.

For the lending bank to investigate the degree of risk involved in the project, it needs to investigate the following:

• the management structure of the borrowing company and the board of directors;
• the company’s audited balance sheet and profit and loss account;
• whether the borrower maintained an acceptable debt-equity ratio;
• limiting unsecured exposure;
• some form of recourse to assets;
• whether all inventories are comprehensively insured at all times;
• the project’s primary source of income;
• the project’s secondary source of income;
• the project’s condition of contract; and
• the introduction of covenants.

A risk rating can then be devised which takes into account all the various factors affecting the proper evaluation of risks. An extensive search in risk management literature yielded seven factors that have the most significant influence on evaluations. These factors were put in a tabulated form and presented to selected credit managers in banks for their opinions. The rated results are shown in the model (Table 6.1). An excellent financial performance, for example, sustained over a long period of time with cash flow covering the debt servicing and a strong equity base warrants 25 marks
on the Financial Condition scale (No. 1). Unavailable financial statements with unsatisfactory cash flow, on the other hand, cannot be awarded any marks.

Table 6.1 Ratings for evaluating a contracting firm

<table>
<thead>
<tr>
<th></th>
<th>Financial Condition (balance sheet &amp; cash flow)</th>
<th>0 - 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Security/Collateral</td>
<td>0 - 20</td>
</tr>
<tr>
<td>3.</td>
<td>Management</td>
<td>0 - 20</td>
</tr>
<tr>
<td>4.</td>
<td>Market position of company</td>
<td>0 - 10</td>
</tr>
<tr>
<td>5.</td>
<td>Condition of Construction Industry</td>
<td>0 - 10</td>
</tr>
<tr>
<td>6.</td>
<td>Conduct of Account</td>
<td>0 - 10</td>
</tr>
<tr>
<td>7.</td>
<td>Company &amp; Owner Reputation</td>
<td>0 - 5</td>
</tr>
</tbody>
</table>

The ratings can then be translated as follows:

Table 6.2 Translations to the risk ratings

<table>
<thead>
<tr>
<th>Numerical Risk Rating</th>
<th>Translated Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>81 - 100</td>
<td>Superior</td>
</tr>
<tr>
<td>71 - 80</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>61 - 70</td>
<td>Acceptable</td>
</tr>
<tr>
<td>51 - 60</td>
<td>Watch</td>
</tr>
<tr>
<td>45 - 50</td>
<td>EMA*</td>
</tr>
<tr>
<td>35 - 44</td>
<td>Substandard</td>
</tr>
<tr>
<td>25 - 34</td>
<td>Doubtful</td>
</tr>
<tr>
<td>15 - 24</td>
<td>Loss</td>
</tr>
</tbody>
</table>

* Especially Mentioned Assets

The properties of Translated Keys can be defined as follows.
**Superior**
- Good credit
- Good asset quality and liquidity
- Very good debt capacity and operating cash flow
- Very good management
- Audited financial statements are available
- Good access to capital market

**Satisfactory**
- Acceptable business credit
- Satisfactory asset quality and liquidity
- Acceptable debt capacity and operating cash flow
- Credit likely to require some collateral
- Some management weakness
- Financial statements are expected
- Company is mid-tier competitor in local market

**Acceptable**
- Weaker but acceptable business credit
- A well secured credit
- Borderline asset quality
- May have somewhat strained liquidity
- Limited debt capacity
- Management weakness
- Financial statements may be available but may be weak
- Company is lower-tier competitor in local market
- Cash flow and profits are somewhat unreliable

**Watch**
- Loans of lower quality than Acceptable
- Given classification by credit officer when emerging problems are detected
- Credit requires special attention
EMA (Especially Mentioned Assets)
- 1st phase of classification
- Loan of higher quality than substandard but containing potential danger
- Especially Mentioned Assets (advances) to be separated by Risk Management Division for special attention
- Credit managers are required to monitor Especially Mentioned Assets that lie in this category

Substandard
- Loan inadequately protected by currently sound net worth, paying capacity of the borrower, or pledged collateral
- Loan having unsatisfactory characteristics causing unacceptable level of risk which could jeopardise the repayment

Doubtful
- Down-graded substandard loan with weaknesses inherent to the substandard classification and in which collection or liquidation in full is questionable
- Debt servicing is erratic with several past overdue payments and the borrower seems unable to generate enough cash flow from normal business operations to resume payment
- Loan is managed by Debt Servicing Division

Loss
- Rating assigned to loans considered partly or wholly uncollectible
- The bank expects significant write-offs
- Collateral or guarantees are the main source for collection and legal procedure to be initiated
- Debt Servicing Division is to manage the recovery effort
6.3 Risks in financing the execution of construction projects

Construction contracting is a high risk business due to the numerous factors that influence it but remain beyond the contractors' control. Bankers, who give credit to construction contractors, find the latter's businesses difficult to evaluate for credit purposes. They find construction contractors to be largely high risk-takers. According to Still (1991, p.45), "viability of loan is the first principle of credit. The purpose of the loan must appear logical and sensible". He then outlines two ways of recovering the loan: the first should be tied to a positive cash flow; and the second should be tied to sound asset values. Whatever the loan, the key concept in determining asset value is that an asset's value is a function of its earning power. A good credit analyst disregards the concept of accounting values.

To be able to evaluate the risks involved, the lending banks must first understand the contractors and the elements affecting their success or failure. Schleifer (1989, p. 4-15) stated that there are ten elements of risk of failure. Five relate to the company's business strategies or practical considerations, and five relate to fiscal or accounting considerations:

1. Increase in project size
2. Unfamiliarity with new geographic area
3. Moving into new types of construction
4. Replacing key personnel
5. Lack of managerial maturity
6. Poor use of accounting systems
7. Failure to evaluate project profitability
8. Lack of equipment cost control
9. Poor billing procedure
10. Transition to or problems with computerised accounting

Schleifer does not suggest that contractors should fear growth or the necessity to expand into unfamiliar locations or new types of construction. What is being said is that events or decisions in these areas preceded the failure of a large number of contractors. There is an inherent danger in these elements, and proper planning and a complete understanding of the risks involved are necessary when encountering them. When two or more of these business changes are undertaken at the same time they can
be dangerous. The importance of this area of research warranted a more detailed investigation into risk management literature. This led to the following elaboration.

**Increase in project size**

It is essential for both lenders and borrowers to determine the size and capacity of the contracting firm. A common risk is that contractors tend to increase the volume of their work to maximise revenue. The sudden increase in the size of contractors' projects is the most common cause of failure. Contractors tend to take on larger projects during the profitable years, but problems often develop even before the first of the larger projects is completed. Construction contractors need to take on larger projects in order to grow, but growth should be gradual. The size of the project in relation to the company, and the size of its average projects, has a definite and direct relationship to profitability. When a construction company is working profitably in executing certain average-size projects, it does not follow that it will profit by taking on much larger projects.

**Unfamiliarity with new geographic areas**

Changing the area of operations from where a contractor normally works is almost as common an element preceding failure as the change in project size. While there are many good business reasons for a contractor to expand into new geographic areas, such as growth, lack of work in its primary area and more opportunities in the new areas, the risks involved must be recognised.

**Moving into new types of construction**

Contractors will change or add to the type of construction they usually do for a variety of reasons. Changing from one type of civil engineering work to another, or from building housing estates to high rise buildings, can be very costly. The learning period, during which an organisation adjusts to executing a new type of work, is costly. A company may have to complete one or two new types of contract at the break-even point or at a loss before it can take on a third profitably. This could cost a lot more than expected, and some companies go bankrupt in the process.
Most contractors are, therefore, more specialised than they like to admit. This becomes more apparent when bidding for new contracts where some bid for several types of project but seem to get mostly one kind. This can only explain that because they are specialised in constructing that type of work, they can price it better and have a winning edge over their competitors.

Replacing key personnel

There are three primary functional areas of a construction business that must be adequately managed:

- Estimating;
- Administration and accounting; and
- Construction operations.

Every successful construction company must have a top-level manager responsible for each one of the above areas. The loss of a profit-making top manager puts a construction company at risk. This risk should not be combined with others until a suitable replacement is found.

Lack of management maturity

For contracting firms, lack of management maturity is a primary risk that should be carefully analysed. It is the most widespread element of contractor failure. It can also contribute to some of the other failure elements identified by Schleifer. At the project level, successful completion on time and within budget requires skilful and mature project managers. On the organisational level, changes are necessary in the growth periods and knowing when and how to make such changes needs management skills and maturity.

Poor use of accounting systems

Construction companies are fast paced with large amounts of other people’s money passing through their accounts. They require systems and procedures to capture all the information and process it quickly and efficiently. Contractors are often at risk of
deficient cash flow. Those with weak invoicing and debt collection procedures are at a greater risk.

Unlike other industries, the terms of payment for construction work are never in full. Late payment for work done because of inefficient invoicing is unacceptable. Top management is responsible for this critical side of the business.

**Failure to evaluate project profitability**

A construction company turns over a large amount of money in comparison with what it keeps. Most construction companies are working with a four to six per cent profit margin. In practice very few projects are tendered for, awarded and completed conveniently within a given financial year to allow for the expedient verification of the base data. On-going construction projects cannot be measured accurately. All parties involved in the process of determining the percentage completion of projects benefit from a higher evaluation. There is a natural tendency to err on the higher side, and to over-state the profitability of the work in progress.

**Lack of equipment control**

Each project must bear equipment costs whether company-owned or hired. This can best be done by applying a hire rate for each and every piece of equipment on site. To do otherwise could create a situation whereby projects report profits, the company reports a loss at the end of the year. Accounting for idle equipment affects job profitability because costs are incurred whether a machine is used or not.

**Poor billing procedure**

In the construction industry, regular monthly progress payments have enabled many businesses to commence with low capital bases. Low capitalised contractors with inefficient valuation and collection procedures are at a much greater risk than others. The terms of payments in construction contracting compel contractors to work to tight budgets. Late approval and collection of a large progress payment could put a contractor's whole cash flow in jeopardy.
Transition to or problems with computerised accounting

Accurate and timely records of numerous transactions and Variation Orders must be kept for each contract. The need to convert to computerised accounting becomes more apparent as the company grows. The process of converting from a manual to a computerised system to cope with the increased load can be full of problems. Problems can also appear in the transition from one computer system to another.

The foregoing elements stress the need for the lending bank to examine carefully the contractor's organisation before extending finance. The keeping and understanding of records on the causes of contractor failure enables the banker to discuss the possible unforeseen risks that the prospective borrower might take.

6.4 Risk management

"Banks operating in the international field have to act prudently both in assuming risks - which no one can avoid doing - and in making adequate provisions." Guth (1981, p.29).

Bankers agree that they are in the risk business, and they aim to limit the degree of risk rather than the number of risks. Risk and return are entwined and form the basis of lending.

Risk management literature stresses the identification of risk as the most important step towards managing it. Proper risk identification is necessary and must be ongoing if a risk is to be discovered before it develops into a loss. According to Bond (1991, p.21-28) risk management literature gives a five-step decision process that consists of:

- risk identification
- risk assessment
- evaluation of risk alternatives
- selection of an alternative or risk control measure
- on-going monitoring of the risk management programme
Financial risk management is part of a banker's daily activities. Portfolio diversification, loan analysis, loan grading, risk pricing of loans, lending limits on organisations and countries, contingency planning, monitoring and early warning systems are all used by lending banks as risk control measures.

For lenders, risks in Project Related Finance are more easily identifiable than in other forms of finance as they are restricted to one project.

6.4.1 Insurance

In planning the best risk-handling programme, insurance cover is the cornerstone to adequate financial protection. Insurance does not eliminate all the risks involved in construction contracting, but it transfers most of the financial threat to a professional risk bearer. Insurance represents contractual security against anticipated potential damage or liability whereby the insurer undertakes to indemnify the insured for a stipulated premium against particular perils described in the policy.

There are a number of different policies that cover various forms of losses, some are mandatory and others are optional depending upon the contracting company's ability to take the risks involved and its pricing strategy. Some principal contractor insurance policies are: Comprehensive General Liability Insurance; Workmen's Compensation and Employers' Liability; Builder's Risk Insurance; Contractor's Plant Coverage and Property Insurance.

Lending banks are known to ask borrowers to assign certain insurance policies to them especially those relating to mortgaged plant.

6.4.2 Willingness to assume risks

Banks' policies towards risk are partly influenced by the personalities of the banks' management and partly by the characteristics of the banks' deposit liabilities. Thus a bank with fluctuating deposit liabilities in a static community will tend to be a
conservative lender, while a bank whose deposits are growing with little interruption may follow more liberal credit policies. Weston and Brigham (1993) have explained that some banks have "creative banking policies" while others tend to be more conservative. A large bank with a broad diversification across different industries or over geographic regions is able to combine and average risks and can therefore reap the benefits thereof. Thus, credit risks that might be unacceptable to a small or specialised bank can be pooled by a larger bank to reduce the overall risk of a group of marginal accounts.

6.4.3 Risk and uncertainty

To be able to define uncertainty it is best to look at certainty first. Certainty exists only when one can tell what will happen during the decision period. This, of course, is an ideal situation which does not happen very often in the construction industry. Decisions can, however, be made to lessen the probability of risk in a particular event by looking up the historic data related to similar events. Uncertainty, on the other hand, can be defined as a situation where there are no historic data to refer to. The element of risk is therefore more relevant to the construction industry than that of uncertainty.

The decision-making process of any lending bank that finances contractors must, therefore, include a reliable method of risk analysis peculiar to that particular line of business. A good method of identifying risks in construction contracting is to create a check list of certain risks that are relevant to the construction industry and refer to it in the loan analysis stage. The check list should contain all the possible risks that could arise from the seven main areas of risk referred to earlier.

- Estimate risk
- Completion risk
- Resource risk
- Operations risk
- Market risk
- Currency risk
- Political risk
When each main area was examined closely it led to other risks. These were put together and were presented in the Questionnaire Results (Appendix A). The results obtained from the questionnaire are summarised in Figure 7.1: Acceptability of Risk in Construction Projects.

6.5 Summary

Construction contracting is a business which operates in a risk-taking environment with many constantly changing variables that can have adverse and/or beneficial effects on the project. The Project Related Finance approach, however, enables lending banks to appraise and manage risks that are confined to the execution of one particular project, as opposed to general company finance. This can be done by evaluating the estimate, monitoring both the cash flow and project progress.

This chapter has shown that the identification, evaluation and treatment of risk are essential for both the contracting organisation and its lenders and offered methods to perform these tasks.
CHAPTER SEVEN

DATA GATHERING
CHAPTER 7  DATA GATHERING

7.1 Introduction

Research data can be derived from a variety of sources, but most frequently it is derived from surveys. According to Orenstein & Phillips (1978, p.216)

"approximately 90 per cent of the articles that appeared in The American Sociological Review, a leading professional journal, between 1962 and 1969, used data derived from either interviews or questionnaires".

The sample of civil engineering companies to be targeted was selected from the UAE Contractors Directory (1992). Their turnover ranged from US $11m. to US $470m.

The sample of banks was selected from the list of banks in the UAE Central Bank Annual Report for 1992.

7.2 The questionnaire

The questionnaire was posted to 320 contracting companies and 42 banks operating in the UAE and the Gulf. There were two versions, one for contractors (borrowers) and another for banks (lenders). Each version was made up of two parts. Part 1 was common to both versions and contained nine assumptions on Project Related Finance seen as suitable definitions of the subject. The respondents were requested to indicate their measure of agreement or disagreement by circling the appropriate number given. Part 2 was a survey of Project Related Financing practice and was headed as such. It contained 17 questions in the borrowers’ version and 21 questions in the lenders’ version. The borrowers’ version was 10 pages long and the lenders’ version was 12 pages long.

7.2.1 Formulating the questionnaire

Data obtained using the questionnaire approach is limited to the written responses of subjects to prearranged questions. It is, therefore, essential to write clear, simple,
understandable questions so that they are understood in the same way by all respondents. The questions used in the two versions were of two types:

- closed with ordered choices, where the respondent chooses from a list of alternative answers by ticking a box or circling a number; and
- semi-closed, where the respondent can either choose an answer or write one in the space provided.

The closed type of questions were used to save the respondent time and effort in supplying the required data. The semi-closed type questions were thought to give an opportunity for greater flexibility in eliciting information.

7.2.2 Response to the questionnaire

Of the 320 questionnaires issued to contracting companies 30 (9.375 per cent) were returned completed and used in the survey analysis (summarised in Table 7.1). Of the 42 questionnaires issued to banks 20 (47.62 per cent) were returned completed and used in the survey analysis (summarised in Table 7.2). According to Moser and Kalton (1971, p.262): "Mail surveys with a response of as low as 10 per cent are not unknown, while rates of over 90 per cent have been reported on a number of occasions". The total turnover of the respondent companies for 1992 was US $2.210 billion. The total capital and reserves of the respondent banks for 1992 was US $2.571 billion and construction finance given was US $1.796 billion.

7.2.3 Questionnaire results

In research surveys, data consists of the answers respondents give to questions. It is reasonable to assume that people in responsible positions in banks and contracting firms who are willing to take part in a questionnaire survey give answers that are true reflections of their organisations' policies. The answers obtained were grouped together in the same format as that used in the questionnaire (see Appendix A). The research identified fifteen sources of risk that have to be dealt with in construction projects generally and presented them in the questionnaire to both contractors and bankers in order to assess their reaction. The answers relating to risks were then tabulated (see Table 7.3 and 7.4) and presented graphically in Figure 7.1.
Table 7.1  Contractors participated in the survey

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Source: Author
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Source: Author
Table 7.3  Acceptability of risk by contractors in construction projects

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<td>27 27 27 27 27 27 27 27 27 27 27 27</td>
</tr>
<tr>
<td>TOTAL</td>
<td>141 96 75 81 57</td>
<td>1187 1187</td>
</tr>
<tr>
<td>Total/30x100</td>
<td>470 320 250 270 190</td>
<td>1500 1500</td>
</tr>
</tbody>
</table>

Source: Author

**Key**

1. Acceptable
2. Fairly Acceptable
3. Negotiable
4. Acceptable with conditions
5. Unacceptable

120
Table 7.4 Acceptability of risk by banks in construction projects

<table>
<thead>
<tr>
<th>BANKS</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>INTENSITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>57</td>
</tr>
<tr>
<td>B</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>1</td>
<td>3</td>
<td>49</td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>55</td>
</tr>
<tr>
<td>D</td>
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<td>1</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>44</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>44</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>11</td>
<td>3</td>
<td>62</td>
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<tr>
<td>G</td>
<td>1</td>
<td>0</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>53</td>
</tr>
<tr>
<td>H</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>7</td>
<td>2</td>
<td>56</td>
</tr>
<tr>
<td>I</td>
<td>2</td>
<td>7</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>49</td>
</tr>
<tr>
<td>J</td>
<td>1</td>
<td>0</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>52</td>
</tr>
<tr>
<td>K</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>3</td>
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</tr>
<tr>
<td>L</td>
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<td>1</td>
<td>6</td>
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<td>4</td>
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<td>6</td>
<td>2</td>
<td>4</td>
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<td>6</td>
<td>5</td>
<td>1</td>
<td>49</td>
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<td>5</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>42</td>
</tr>
<tr>
<td>P</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>47</td>
</tr>
<tr>
<td>Q</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>45</td>
</tr>
<tr>
<td>R</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>54</td>
</tr>
<tr>
<td>S</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>51</td>
</tr>
<tr>
<td>T</td>
<td>1</td>
<td>11</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>35</td>
</tr>
</tbody>
</table>

**TOTAL** | 29 | 48 | 85 | 73 | 65 | 992       |

**Total/20x100** | 145 | 240 | 425 | 365 | 325 | 1500      |

**Source:** Author

**Key**

1. Acceptable
2. Fairly Acceptable
3. Negotiable
4. Acceptable with conditions
5. Unacceptable
Figure 7.1 Acceptability of risk in construction projects

ACCEPTABILITY OF RISK IN CONSTRUCTION PROJECTS

Acceptability scale

1 = Acceptable
2 = Fairly acceptable
3 = Negotiable
4 = Acceptable with conditions
5 = Unacceptable
7.3 The interviews

It was decided at the outset of this research to use interviews as well as questionnaires for testing the study's assumptions and hypotheses. The impersonal nature of a questionnaire, however, with its standardised wording and order of questions may ensure some uniformity, but a question with standard wording may have different meanings for different people. Although the questionnaires yielded the required results for testing the assumptions and hypotheses, the interviews were necessary to give 'in depth' assessment and verify the information obtained from the questionnaires. The 'facts' reported in the questionnaires must, of course, be evaluated in terms of credibility. Eight lenders and twenty borrowers out of those who completed the questionnaires, and who practise Project Related Finance, were chosen for interviews. The persons concerned were contacted by telephone, as their names and job titles were known in advance, and appointments were made. None of those contacted declined to be interviewed and all gave between 40 minutes and two hours of their time to answer questions and give more details.

The 'focused interview' approach was used to cover the set topics in a systematic fashion. To focus attention upon a given experience, the interviewer should know in advance the topics or aspects of a question to be covered. In view of this, an interview guide (Appendix B) was drawn up consisting of topic headings derived from the research's hypotheses and assumptions and was used in the interviews. The results of the interviews were the verification of both the assumptions and the hypotheses, and the risks involved.

According to Kidder (1986, p.275), "The focused interview has been used effectively in the development of hypotheses about which aspects of a specific experience lead to changes in attitude on the part of those exposed to it". His definition of the focused interview may be broadened to include any interview in which interviewers know in advance the specific aspects of an experience they wish to have the respondent cover in the discussion. This is regardless of whether or not the investigator has observed and analysed the specific situation in which the respondent participated.
While all of the interviews covered the basic substance of Project Related Finance and the study’s hypotheses, the emphasis of the interview varied depending on the interviewee. Where the questionnaire was restrictive and impersonal, the interview was more flexible enabling both questions and answers to be clarified where necessary and permitting deeper probing into topics of special interest to the interviewee. The interviewee was also able to expand on his answers and engage in a general discussion which would not have been possible with the questionnaire alone.

### 7.3.1 Confidentiality of the survey sample

On confidentiality, Baker (1994, p. 121) wrote

> Confidentiality is a promise to keep the identities of the subjects known only to the researcher and perhaps selected members of his or her staff and to minimise in any available way the possible exposure of a subject's identity. This is often done by the use of code numbers on surveys or of pseudonyms for persons and places that might be identifiable.

In this research, eight banks and 20 contracting companies were visited. In order to respect their confidentiality, it proved impossible to attribute statements or opinions to particular banks, contracting companies or individuals. However this did not affect the usefulness of the findings in any way as banks interviewed were designated capital letters of the alphabet where contractors were given lower-case letters.

### 7.4 The case studies

This approach to the research was considered to be useful as it helped to illustrate the strengths and weaknesses of Project Related Finance in practice. The most stubborn obstacle in this method of research was that of confidentiality and access to bank files. Twenty-eight suitable construction projects that used Project Related Finance were contacted. Six out of the twenty-eight responded favourably and three out of the six were chosen as suitable case studies.
Selection of case studies
During this research the author gathered data on twenty-eight construction contracts that used Project Related Finance. However, it was decided at the outset that only three need to be investigated as case studies. The three chosen case studies included buildings, roads and bridges, and pipeline projects that were currently under construction. The wide variety of the chosen projects was considered sufficient to show the trends and to give added strength to the verification of the findings.

The three case studies were evaluated using the rating model shown in Chapter 6 (Table 6.1).

<table>
<thead>
<tr>
<th>CASE STUDY</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Financial Condition</td>
<td>15</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>(balance sheet &amp; cash flow)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Security/Collateral</td>
<td>12</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>3. Management</td>
<td>12</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>4. Market position of company</td>
<td>5</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>5. Condition of Construction Industry</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>6. Conduct of Account</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>7. Company &amp; Owner Reputation</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>61</td>
<td>72</td>
<td>68</td>
</tr>
</tbody>
</table>

By referring to the Translation to the risk ratings (Table 6.2) Case study A, with a rating of 61 was Acceptable; Case study B, with a rating of 72, was Satisfactory; and Case study C, with a rating of 68, was Acceptable.

7.4.1 Case study A: Construction of 120 low cost houses at Liwa, Abu Dhabi
The project is located in the Liwa area, an agricultural community situated south of the Emirate of Abu Dhabi. It is built on three different sites, Nafeer (Site A), Jabanah
(Site B), and Wazeel (Site C) with forty typical one-storey houses constructed on each site (Figure 7.2). All of the houses are of typical reinforced concrete and blockwork design with reconstructed stone facing for the main villas and white fair face blockwork for the boundary walls. The Scope of Works included soil improvement with approved imported fill compacted in layers, reinforced concrete for the substructure and the superstructure, and hollow block partition walls with cement-sand plaster. Finishes included mosaic and ceramic tiles and stone facing. Boundary walls were built with fair face blocks. Internal footpaths were built using precast concrete kerbstones and interlock tiles. The plumbing and electro-mechanical works, and the joinery and aluminium works were sub-contracted. External works included a sewerage treatment plant, external drainage with associated civil works and a banking slab for slope protection on site C. The contract was a Lump Sum Contract with a breakdown of prices given by the contractor.

Contract start date was 27 October 1990. The contract duration was 24 months but this was subsequently extended by three months and completion date was reset for 24 January 1993. The Contractor experienced difficulties at the start of the project due to the remoteness of the sites and adverse weather conditions. However, the Contractor’s claims for extension of time with costs were due to variation orders.

**Finance facilities for the project**

The contracting company applied to a lending bank for Project Related Finance facilities to execute the said project. The bank, having previously assessed the ownership structure, technical capability and overall financial position of the construction company, studied the tender documents, the projected cash flow and execution programme of the project. It granted them the required facilities as follows:
Table 7.5 Finance facilities for case study A

<table>
<thead>
<tr>
<th>FACILITIES</th>
<th>LIMIT DH ('000)</th>
<th>MARGIN %</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan</td>
<td>2,000</td>
<td></td>
<td>To be deducted from Advance Payment when received.</td>
</tr>
<tr>
<td>OD (PPC)</td>
<td>10,000</td>
<td>10%</td>
<td>PPC to be discounted after Engineer’s approval.</td>
</tr>
<tr>
<td>L/C</td>
<td>4,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usance/Acceptance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perf. Bond</td>
<td>4,086</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.P.G.</td>
<td>5,000</td>
<td>40%</td>
<td>Margin in FD under lien upon receipt to be treated as general security.</td>
</tr>
<tr>
<td>Retn. Gtee.</td>
<td>8,172</td>
<td>25%</td>
<td>Margin in FD</td>
</tr>
<tr>
<td>TOTAL</td>
<td>33,258</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Dhs Thirty three million two hundred fifty eight thousand only)

Security

1. Irrevocable and unconditional assignment of receivables under the contract to the bank.
2. Personal guarantee of all partners.
3. A fixed deposit of Dh2 million under lien (margin of A.P.G.)

Terms and Conditions

1. The loan of Dh2 million should be released to the customer as per cash flow and to be repaid in full from Advance Payment when received.
2. The contractor must undertake to deposit all the project’s proceeds with the bank.
3. A separate account for the project should be opened with the bank for monitoring purposes.
4. Local L/C should contain the following clause:
“Invoices to be countersigned by the project engineer appointed by the customer confirming that the goods delivered to site conform to the specification stipulated in the contract.”

5. The progress of the project and position of the account should be monitored monthly to ensure their smooth operation.

6. The facilities will be made available to the customer after all the formalities have been completed.

Conclusion

- The contractor completed the works satisfactorily.
- The value of the total limits agreed with the bank constituted 44.05 per cent of the contract’s cost.
- Bank charges were 1.65 per cent of the contract’s cost.
- Discounting of Progress Payments started in the second month.
- First Progress Payment was realised in fourth month.
- Accumulated Certified was less than Planned up to the twenty-sixth month of the project.
- The average of the difference in days between valuation submittal to certification was 18 days.
- Accumulated Cost was more than Accumulated Certified for the first two months of the project then it dropped in the third month due to the Advance Payment but increased gradually and became larger than certified up to month 23.
Figure 7.2 Location Plan for Case Study A
# Table 7.6 Cash flow chart for Case Study A

## CASE STUDY "A"

<table>
<thead>
<tr>
<th>M/S</th>
<th>ACCOUNT NO</th>
<th>DATE</th>
<th>CONTRACT VALUE</th>
<th>Dh81,717K</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJECT: 120 LOW-COST HOUSES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OWNER/financier:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAIN CONTRACTOR:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMENCEMENT DATE: 27-10-1990</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPLETION DATE: 24-01-1993</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAINTENANCE PERIOD: 12 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTRACT PERIOD: 2 years + 3 months extn</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONSULTANT:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COST (Cash Out-Flow)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1 Mobilisation</td>
<td>500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Materials:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local LC/TR / Acct. Settlement</td>
<td>280</td>
<td>320</td>
<td>240</td>
<td>210</td>
</tr>
<tr>
<td>Import LC/TR / Acct. Settlement</td>
<td>0</td>
<td>0</td>
<td>715</td>
<td>815</td>
</tr>
<tr>
<td>Cash Purchase / L/Po</td>
<td>320</td>
<td>516</td>
<td>827</td>
<td>616</td>
</tr>
<tr>
<td>SUB - TOTAL</td>
<td>0</td>
<td>600</td>
<td>836</td>
<td>1,782</td>
</tr>
<tr>
<td>3 Sub-Contractors</td>
<td>130</td>
<td>270</td>
<td>360</td>
<td>700</td>
</tr>
<tr>
<td>4 Wages and Salaries</td>
<td>90</td>
<td>130</td>
<td>210</td>
<td>324</td>
</tr>
<tr>
<td>5 Plant and Machinery</td>
<td>200</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>6 Overheads</td>
<td>110</td>
<td>104</td>
<td>163</td>
<td>205</td>
</tr>
<tr>
<td>7 Bank Charges</td>
<td>4</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>TOTAL CASH OUTFLOW</td>
<td>504</td>
<td>1,144</td>
<td>1,441</td>
<td>2,629</td>
</tr>
<tr>
<td>CUMULATIVE CASH OUTFLOW</td>
<td>504</td>
<td>1,648</td>
<td>3,089</td>
<td>5,718</td>
</tr>
<tr>
<td>INCOME</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net PPC Realized</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adv. Payment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less: Adv. Payment (Margin) &amp; Release</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ret. Money (Bank Margin) Release</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL CASH INFLOW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CUMULATIVE CASH INFLOW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NET SURPLUS / DEFICIT</td>
<td>(504)</td>
<td>(1,144)</td>
<td>1,559</td>
<td>(1,574)</td>
</tr>
<tr>
<td>CUMULATIVE SURPLUS / DEFICIT</td>
<td>(504)</td>
<td>(1,648)</td>
<td>(4,997)</td>
<td>(6,663)</td>
</tr>
<tr>
<td>DEFICIT COVERAGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own Source</td>
<td>4</td>
<td>198</td>
<td>(2,956)</td>
<td>(2,647)</td>
</tr>
<tr>
<td>OD (FPC) @ 90%</td>
<td>910</td>
<td>3,045</td>
<td>4,310</td>
<td>5,110</td>
</tr>
<tr>
<td>Loan</td>
<td>500</td>
<td>500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>504</td>
<td>1,648</td>
<td>89</td>
<td>1,663</td>
</tr>
</tbody>
</table>
Figure 7.3 Cumulative Planned vs Certified vs Cost for Case Study A
<table>
<thead>
<tr>
<th>Valuation No</th>
<th>Month &amp; Year</th>
<th>Date Submitted</th>
<th>Date Approved</th>
<th>Difference Days</th>
<th>Valuation Amount</th>
<th>Certified Income</th>
<th>Amount Planned</th>
<th>Difference Cumulative Cert. Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10/90</td>
<td></td>
<td></td>
<td></td>
<td>5,000,000</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>01/91</td>
<td>02/02/91</td>
<td>28/02/91</td>
<td>26</td>
<td>1,055,120</td>
<td>0</td>
<td>0</td>
<td>1,258,000 (1,258,000)</td>
</tr>
<tr>
<td>3</td>
<td>02/91</td>
<td>01/03/91</td>
<td>25/03/91</td>
<td>24</td>
<td>2,328,000</td>
<td>5,000,000</td>
<td>2,775,000</td>
<td>4,033,000 967,000</td>
</tr>
<tr>
<td>4</td>
<td>03/91</td>
<td>04/04/91</td>
<td>23/04/91</td>
<td>19</td>
<td>2,451,100</td>
<td>1,055,120</td>
<td>2,934,000</td>
<td>6,967,000 (911,880)</td>
</tr>
<tr>
<td>5</td>
<td>04/91</td>
<td>17/05/91</td>
<td>29/05/91</td>
<td>12</td>
<td>3,217,125</td>
<td>2,328,000</td>
<td>3,835,000</td>
<td>10,802,000 (2,418,880)</td>
</tr>
<tr>
<td>6</td>
<td>05/91</td>
<td>03/06/91</td>
<td>18/06/91</td>
<td>15</td>
<td>3,133,010</td>
<td>2,451,100</td>
<td>3,735,000</td>
<td>14,537,000 (3,702,780)</td>
</tr>
<tr>
<td>7</td>
<td>06/91</td>
<td>06/07/91</td>
<td>25/07/91</td>
<td>19</td>
<td>4,638,110</td>
<td>3,133,010</td>
<td>5,529,000</td>
<td>20,066,000 (6,014,655)</td>
</tr>
<tr>
<td>8</td>
<td>07/91</td>
<td>03/08/91</td>
<td>23/08/91</td>
<td>20</td>
<td>5,078,110</td>
<td>4,638,110</td>
<td>6,054,000</td>
<td>26,120,000 (8,935,645)</td>
</tr>
<tr>
<td>9</td>
<td>08/91</td>
<td>02/09/91</td>
<td>11/09/91</td>
<td>9</td>
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<td><strong>81,717,000</strong></td>
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7.4.2 Case study B: Extension of Beniyas Road, Dubai

The project, located in Sector 125 of Dubai Municipality, is intended to provide an integrated traffic system between the commercial district along the northern bank of the Dubai Creek and Tariq Ibn Ziyad Road which crosses the creek at the Al Maktoum Bridge (Figure 7.4). The project comprised the following:

- The widening and reconstruction of the existing Beniyas Road to a dual two-lane highway over 600 metres from Etisalat junction through to a new roundabout to be constructed adjacent to the Kuwaiti Consulate.
- The improvement of Omar Ibn Al Khattab Road between D.E.W.C. junction and Etisalat junction.
- The construction of the extension of Beniyas Road as a dual three-lane highway from the new roundabout at the Kuwaiti Consulate for a distance of 2000 metres to connect to the proposed new road network to be constructed (by others) in Dubai Municipality Contract R 384.
- A dual three lane link road of 600 metres between Junction 9 on Beniyas Road and Flame Roundabout.
- The construction of a grade separated interchange at the intersection of Beniyas Road and Tariq Ibn Ziyad Road including an underpass below Tariq Ibn Ziyad Road (Underpass 1) and 1700 metres of associated slip roads.
- The construction of a two-lane single carriageway underpass from Al Maktoum Road to Tariq Ibn Ziyad Road (Underpass 2).
- The diversion, and/or protection of existing utilities, and the provision for new utilities.
- The provision of hard landscaping to the general area of the site with base irrigation services to allow the subsequent provision (by others) of the soft landscaping and planting.

The contract period including mobilisation was 609 days with completion date set for 14 March 1994. Mobilisation for the project commenced on the contract start date of 13 July 1992 with the contractor fencing off the designated area for the site establishment and erecting the site offices. There was an initial delay of six weeks
caused by the slow response of Dubai Telecommunication (Etisalat) in relocating ground cables. The re-routing of services and temporary traffic diversions were two major items in the contract.

**Underpass Number 1**

Work started on Underpass Number 1 on 18 November 1992 with the diversions of traffic and existing services. Open cut excavations got underway on the south side of the underpass first. Dewatering equipment was brought to site and was operational where excavations reached a depth of 1.5 metres. The dewatering system, comprising six metre-deep well points, was set up on the reduced level periphery and kept operational for 48 hours before further excavations were carried out. Batters were formed to suit the material stability and the levels were further reduced by approximately four to four and a half metres. A second dewatering system, similar to the one already installed, was set up on the reduced circumference. Excavations were then continued forming batters as described previously to a reduced level approximately 500mm above formation level. A third dewatering system, similar to those already described, was then positioned to the skirting of the base slab areas and the remaining excavations to the formation level were carried out.

The setting out of the base slab and the blinding concrete was cast after receipt of the Engineer's approval. A waterproof membrane to receive screed was placed according to the manufacturers' recommendations.

The base slab shutters were then positioned, lined and levelled with allowances made for expansion joints. Internal waterstops and shear connectors were positioned and steel fixed using spacer blocks and 'chairs' to ensure adequate cover. The entire area was thoroughly cleaned with compressed air and, on receipt of the Engineer's approval, ready mixed concrete was placed using concrete pumps.

Work on the abutment walls and central medians was started simultaneously on 8 March 1993 to get them ready to support the deck as the bridge was scheduled to open for traffic on 3 November 1993. Work on the crossheads got underway as work
progressed on the decks starting with the south deck and finishing with the north deck. The central medians were completed on 17 April 1993 and were made ready to receive the south deck shutter first. Shuttering for the south half of the deck structure was actually started on 12 April 1993 and it was ready to receive the finishes by 31 May 1993. Work on the north deck was started on 14 June 1993.

Work on the walkway walls started on 21 June 1993 and the ceramic tiling on the internal face of the abutment walls on 9 August 1993. A pre-cast yard was set up on site for the production of New Jersey Barriers.

Underpass Number 2
This was designed as a two-lane single carriageway underpass to take traffic from Al Maktoum Road to Tariq Ibn Ziyad Road. As the construction of this underpass came very close (4 metres) to the existing tunnel carrying traffic in the opposite direction, and due to the general heavy volume of traffic in the vicinity, it was decided to use the ‘Bentonite Slurry Trench Cutting Technique’ for excavations for the diaphragm walls. The placing of concrete was done through tremie pipes.

Plant
The plant needed for this operation are the Trench Cutter, with a specially designed crawler crane to support it, and a bentonite plant. The Trench Cutter is made up of two cutting wheels that rotate on horizontal axles in opposing directions, hydraulic motors and a centrifugal pump, all supported on a heavy steel frame. The function of the centrifugal pump is to continuously remove the soil/rock fragments in the bentonite suspension. The crawler crane supporting the Trench Cutter is aligned so as to travel parallel and to one side of the diaphragm wall axis.

Construction procedure
Prior to the commencement of trenching operations, an adequate supply of pre-cast 1.8 metre high guide walls were made available. Pre-excavation with a back-hoe for a depth of two metres was carried out and the guide walls were positioned both to define the inner and outer faces of the diaphragm wall and to ensure trench-stability
To ensure maximum verticality of the excavated trenches, the suspended trench cutter was equipped with an automatically controlled cable and hose suspension with an electronic inclinometer.

After the pre-excavation and alignment of the guide walls, the trench cutter was positioned and a 'starter panel' was excavated in three 'bites'. The outer bite was 2.20 metres whereas the width of the centre bite varied between 0.85 metres and 1.15 metres, depending on the total panel width. The wall was one metre thick. Using the bentonite solution as a medium, the excavated material was pumped out and recycled by pumping it back into the trench.

The bentonite in the trench was checked for contamination and, if found outside the permitted range, the trench cutter would be lowered into the trench to pump out the contaminated bentonite. The reinforcement cage, built on a specially made table on site, was then lifted from the horizontal to a vertical position using a crane. Once the cage and table were vertical, the cage was held in place whilst the table was lowered to the ground to be used for the fabrication of another cage. The cage was lowered into the excavated trench at three metre intervals to allow the fixing of approved spacer blocks. After reaching the required level, the cage was suspended from the guide wall and concreting was carried out using two tremie pipes. The tremie-mix concrete of 175 mm slump was discharged directly into the funnels of the tremie-pipes from the transit mixers.

A 'follower panel' was then cast with one side constructed against a previously constructed panel and the other side against natural ground. To ensure the joints between the panels were watertight, water bars were installed using steel stop-ends. The water stop extended from the guide-wall level down to two metres below the slab level. Closure panels were constructed to close the gap between two follower panels and are therefore cast against previously constructed panels on both ends. Starter panels received a stop-end with a waterstop at both ends, and follower panels only at the end touching natural soil. However, no stop-ends were required for closure panels. Excavation operations between the two walls and removal of excavated
material got under way at the end of the specified concrete curing time. Contaminated concrete at the cut-off level was removed before fixing the roof slab shuttering. The roof slab steel was then fixed and the joints in the slab were shifted to coincide with construction joints in the diaphragm walls. The same precaution was taken with joints in the base slab.

Road construction and hard landscaping
Prior to excavations to formation level, the contractor dug pilot holes/trenches to identify the existing services and re-locate them where necessary. The services included the following:

- electrical;
- telephones;
- lighting;
- foul water;
- potable water;
- storm water;
- irrigation; and
- fire protection.

The formation level was prepared to receive sub-base material which consisted of natural sand and a gravel aggregate mixture. The granular sub-base material was graded to BS 1377 and compacted to a minimum thickness of 150 mm. The wet mix sand and crushed stone material was then applied using a paver finisher and compacted to the correct profile with a minimum thickness of 150 mm. The contractor proceeded with the hard landscaping and interlocking concrete paving blocks. The kerb stones and concrete haunchings were completed before the 60 mm thick asphaltic concrete base course was applied. The 40 mm wearing course was left until the end of contract to ensure a smooth and clean finish.

Finance facilities for the project
After award, the contracting company requested its bank to finance the execution of the contract according to its projected cash flow and execution programme. The bank,
having good business relations with the company for a number of years, asked for an update on the company’s financial position and information about the project. It then responded favourably and extended the required facilities as per the following table:

Table 7.8  Finance facilities for Case Study B

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<tr>
<th>FACILITIES</th>
<th>LIMITS DH ('000)</th>
<th>PRICING %</th>
<th>MARGIN %</th>
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<tbody>
<tr>
<td>OD (PPC)</td>
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<td>10</td>
<td>15</td>
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<td>OD (CLEAN)</td>
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<tr>
<td>LOAN</td>
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<td>10</td>
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<tr>
<td>L/C IMPORT (s) FA</td>
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<tr>
<td>L/C IMPORT (s+u) MAT/ACCEPT./TR (60 DAYS)</td>
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<tr>
<td>PERFORMANCE BOND</td>
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<td>TOTAL</td>
<td>34,935</td>
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(Dhs Thirty four million nine hundred thirty-five thousand only)

Security/support

1. Irrevocable assignment of the project’s proceeds in favour of the bank signed by the Contractor and advised to the Employer.
2. A corporate guarantee covering the total limits above.
3. A mortgage on equipment registered in the Traffic Department to partially support the Dh5 million loan. Related Insurance Policy to be duly assigned to the bank.

Terms and Conditions

1. OD (PPC) should be allowed against PPC's signed by the Engineer.
2. OD (clean) should be allowed as per the project’s cash flow. It would be utilised starting month 10 with Dh1.7 million to be increased to Dh2 million in
month 11 and to Dh3.5 million thereafter which would be settled from the five per cent retention released on the handing over of the project.

3. The loan would be disbursed against the suppliers’ bills or L/Cs drafts.

4. Materials L/C limit would be non-revolving and Acceptance/TR would be covered/settled from related PPC’s when OD (PPC) is allowed.

5. The customer undertakes to deposit the contract’s proceeds with the bank.

6. The performance bond would be issued at five per cent margin to be placed in FD under lien.

7. Project Management fee of Dh10,000 should be recovered on acceptance of the above facilities.

8. The customer’s undertaking that net worth, which includes paid-in capital, retained earnings and reserves, would not fall below Dh12.02 million as long as credit facilities are extended.

9. The bank’s engineer will be allowed to visit the project site periodically in order to be updated on the project progress until completion.

Conclusion

- The contractor completed the works satisfactorily.
- The value of the total limits agreed with the bank constituted 32.9 per cent of the contract’s cost.
- Bank charges were 1.98 per cent of the contract’s cost.
- Discounting of Progress Payments started in the second month.
- The first Progress Payment was realised in the fourth month.
- Accumulated Certified was less than Accumulated Planned throughout the duration of the project.
- Accumulated Cost was larger than Accumulated Certified until completion in the twenty-fourth month.
- The average of the difference in days between valuation submittal and certification was 27 days.
Figure 7.5 Diaphragm Wall Construction Case Study B

All dimensions are in cm unless otherwise noted.
## Table 7.9 Cash flow chart for Case Study B

### CASE STUDY "B"

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## Table 7.10  Valuations-Payments Schedule for Case Study B

### CASE STUDY "B"

#### VALUATIONS - PAYMENTS SCHEDULE

<table>
<thead>
<tr>
<th>VALUATION NO</th>
<th>MONTH &amp; YEAR</th>
<th>DATE SUBMITTED</th>
<th>DATE APPROVED</th>
<th>DIFFERENCE DAYS</th>
<th>VALUATION AMOUNT</th>
<th>CERTIFIED INCOME</th>
<th>AMOUNT PLANNED</th>
<th>DIFFERENCE CUMULATIVE</th>
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<td></td>
<td>For the Month</td>
<td>Cumulative</td>
<td>For the Month</td>
<td>Cumulative</td>
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<td></td>
<td></td>
<td></td>
<td>For the Month</td>
<td>Cumulative</td>
<td>For the Month</td>
<td>Cumulative</td>
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<tr>
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<td>02-01-94</td>
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<td>5,488,123</td>
<td>73,510,537</td>
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<td>114,395,296</td>
<td>4,640,320</td>
<td>87,950,408</td>
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Rtn. Ref.
Figure 7.6 Cumulative Planned vs Certified vs Cost for Case Study B

CASH FLOW
CUMULATIVE VALUE PLANNED X CERTIFIED X COST

MONTH

AMOUNT IN MILLION D$m$

- Planned
- Certified
- Cost
7.4.3 Case study C: Transmission pipeline

The contract covered the supply, installation and maintenance for 12 months of 1200 mm diameter potable water transmission pipeline starting from ‘G’ Station, passing and connecting with ‘D’ & ‘E’ Stations in Jebel Ali to 2nd Zabeel Road near Trade Centre Roundabout (Figure 7.7). The contract start date was 11 May 1992 and the duration was 365 days. The scope of the works included associated valves, specials and appurtenant chambers as follows:

- 26 km. of 1200mm diameter A.C. pipeline along the main Abu Dhabi-Dubai Road from Jebel Ali to the Trade Centre Roundabout.
- 1.9 km. and 1.7 km. of 600mm diameter A.C. pipeline to the Jumeira Beach Road.

The contract included ground surveys, the construction of air and butterfly valve chambers, road crossings, the installation of a bulk flow meter, hydraulic testing, flushing and disinfecting and final flushing. The road crossings were carried out by thrust boring in order not to disrupt the flow of traffic. The pipeline was intended to boost the existing supply line to cater for the increasing demand due to the commercial and industrial boom taking place in Dubai.

Finance facilities for the project

The contracting company that was awarded the project applied to a bank for finance facilities for its execution. The lending bank requested a copy of the tender documents, the project’s execution programme and cash flow together with the company’s audited financial report. Finance facilities were then granted as follows:
Table 7.11 Finance facilities for Case Study C

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<tr>
<th>FACILITIES</th>
<th>LIMIT DH('000)</th>
<th>PRICING %</th>
<th>MARGIN %</th>
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</thead>
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<tr>
<td>OD (PPC)</td>
<td>7,500</td>
<td>10</td>
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<tr>
<td>OD (CLEAN)</td>
<td>4,800</td>
<td>10</td>
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<tr>
<td>LOCAL REVOLVING L/C(U)</td>
<td>40,000</td>
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<tr>
<td>ACCEPTANCE (90 days)</td>
<td>(12,000)</td>
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<tr>
<td>IMPORT L/C(S)/BNC</td>
<td>4,000</td>
<td>10</td>
<td></td>
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<tr>
<td>TR (60 days)</td>
<td>(3,000)</td>
<td>10</td>
<td></td>
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<tr>
<td>PERFORMANCE BOND</td>
<td>8,500</td>
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<tr>
<td>TOTAL</td>
<td>64,800</td>
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(Dhs Sixty four million eight hundred thousand only)

Security/support

- Irrevocable and unconditional assignment of the project’s proceeds in favour of the bank signed by the customer (in duplicate) for onward transmission of its original to the Employer for its confirmation.
- A corporate guarantee from the ultimate holding company covering the entire exposure of the project as above.
- The customer’s undertaking to deposit all the contract proceeds with the bank.

Terms and conditions

- Discounting of Progress Payments Certificates should be allowed against certificates signed by the Engineer.
- Overdraft (clean) should be allowed as per cash flow, which will be Dh2 million in June 1992, Dh1 million in March 1993, Dh3 million in April and May 1993 reducing to Dh2 million in June and July 1993. This should be fully settled in October 1993.
- Local Usance/Revolving L/C should be established in favour of the pipe supplier for the supply of pipes with a face value of Dh4 million which should
be revolved nine times more with the condition that the maximum amount of shipments should not exceed Dh40 million. The L/C should stipulate that partial shipments in each revolving credit is allowed and the L/C should be revolved cumulatively. The L/C would be valid only upon receipt of a Performance Guarantee for 10 per cent of the total L/C value from the beneficiary. All claims under the guarantee should be paid to the bank for the credit of the contractor.

- Import L/C should cover purchase of valves and other specialised materials from abroad.
- Acceptances raised would be 100 per cent covered by blocking equal amount of the related PPC when OD(PPC) is allowed.
- TR should be settled from related PPC’s when discounted.
- The margin against the Performance Bond may be placed in FD under lien.
- The customer’s equity should not fall below Dh10 million.
- A project management fee of Dh10,000 is payable in advance on receipt of the acceptance of this offer.
- The bank’s representative should be allowed to inspect the site periodically and should be updated on progress of the works by the Site Agent until completion.

Conclusion

- The contractor completed the works satisfactorily.
- The value of the total limits agreed with the bank constituted 94.22 per cent of the contract’s cost. This was mainly due to the L/Cs for materials.
- Bank charges were 1.36 per cent of the contract’s cost.
- Discounting of Progress Payments started in the second month.
- The first Progress Payment was realised in the fourth month.
- Accumulated Certified was less than Accumulated Cost and Accumulated Planned up to the fourteenth month of the project.
- The average of the difference in days between valuation submittal to certification was 15 days.
TRANSMISSION PIPELINE FROM JABEL ALI TO TRADE CENTRE R/A.

Figure 7.7 Location Plan for Case Study C
## Table 7.12 Cash flow chart for Case Study C

### Case Study "C"

<table>
<thead>
<tr>
<th>Dh,000</th>
</tr>
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</table>

#### PROJECT: DWD 3/4 Transmission Pipeline from Jebel Ali

**Owner/Financier:**

**Main Contractor:**

**Commencement Date:** 11.05.92

**Completion Date:** 10.05.93 (Extended to 24.05.93)

**Maintenance Period:** 365 days

**Contract Value:** Dh76,145,000

**Contract Period:** 365 days (extended)

**Consultant:**

| COST (Cash Out-Flow) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | TOTAL |
|----------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|------|
| 1. Mobilisation       | 200 |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    | 200  |
| 2. Materials          |     |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    | 35,500 |
| Local LC / TR / Acct. Settlement | 1,000 | 4,000 | 3,500 | 1,500 | 1,000 | 2,000 | 2,500 | 3,500 | 3,500 | 3,700 | 3,500 | 1,500 | 500 |    |    |    |    |    | 4,000  |
| Import LC / TR / Acct. Settlement | 2,000 | 1,000 | 1,000 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 2,000  |
| Cash Purchase / L.P.O. | 500 | 601 | 98 | 98 | 98 | 98 | 98 | 98 | 1,099 | 1,099 | 1,600 | 1,597 | 597 | 563 |    |    |    |    |    | 9,653  |
| SUB-TOTAL             | 1,500 | 4,000 | 3,500 | 4,101 | 2,008 | 3,066 | 4,096 | 4,096 | 4,889 | 4,738 | 5,101 | 3,097 | 1,597 | 563 |    |    |    |    |    | 19,153 |
| 3. Sub-Contractors. LC Settlement |     |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    | 2,517  |
| Cheques/PPCs Settlement |     |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    | 2,517  |
| 4. Wages and Salaries  |     |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    | 377    |
| Plant and Machinery    | 21  | 462 | 462 | 462 | 462 | 462 | 462 | 462 | 462 | 462 | 462 | 462 | 462 | 462 |    |    |    |    |    | 5,565  |
| 6. Overheads           | 150 | 150 | 130 | 112 | 88  | 89  | 124 | 123 | 121 | 119 | 110 | 108 | 0    |    |    |    |    |    | 1,411  |
| 7. Bank Charges        | 0   | 20  | 73  | 80  | 58  | 56  | 58  | 56  | 55  | 62  | 77  | 71  | 56  | 39  |    |    |    |    |    | 910    |
| Margin against PB      | 381 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 381    |
| Others                | 375 |    | 432 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 100    |
| TOTAL CASH-OUTFLOW    | 2,260 | 5,017 | 4,550 | 5,237 | 3,176 | 4,425 | 4,835 | 5,457 | 5,452 | 6,685 | 6,617 | 6,218 | 4,491 | 1,240 | 695 | 467 | 19  | 263 | 19 | 96 | 65,773 |

#### CUMULATIVE CASH OUTFLOW

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<th>INCOME</th>
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<td>2,260</td>
</tr>
</tbody>
</table>

- Net PFC Realized @ 90%
- Ret. Money
- TOTAL CASH INFLOW
- CUMULATIVE CASH INFLOW
- NET SURPLUS/(DEFICIT)
- CUMULATIVE SURPLUS/(DEFICIT)
- DEFICIT COVERAGE

**Own Source**

**OD (PPP) @ 85%**

**OD (Clean)**

**TOTAL**

| 2,260 | 7,277 | 11,827 | 14,470 | 11,082 | 12,033 | 12,537 | 12,972 | 12,933 | 12,791 | 13,517 | 14,013 | 12,771 | 11,147 | 8,862 | 5,765 | 2,074 | 974 | (4,043) | (7,856) | 0 |
| MONTH & YEAR | VALUATION NO. | DATE APPROVED | DATE SUBMITTED | VALUATION AMOUNT | AMOUNT PLANNED | DIFFERENCE CERTIFIED | INCOME | CERTIFIED INCOME | INCOME | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFERENCE | DAYS | DIFFEREN
7.5 Summary

To test the research’s hypotheses, data were gathered by means of random sampling through the sending out of questionnaires to contracting companies and banks operating in the UAE. Interviews were conducted with selected participants who practise Project Related Finance. Three current projects were selected as case studies. The procedures employed by the lending bank in each of the three case studies, and the data obtained from them, further verified the hypotheses that were supported by the questionnaires and interview results:

Hypothesis 2 (risk exposure)
- In all three case studies the lending banks demanded irrevocable and unconditional assignments of receivables under the Contract in favour of the bank signed by the Contractor and advised to the Employer.
- The personal guarantees of all partners together with a fixed deposit of Dh2 million under lien were also demanded in case study A.
- In case study B, a corporate guarantee covering the agreed total limits, and the mortgage of plant together with the assignment of the insurance policies of same were demanded.
- In case study C, a corporate guarantee from the ultimate holding company covering the entire exposure was demanded.

Hypothesis 4 (analyse ownership, adequacy of working capital and gearing)
- In case study A, the lending bank assessed the ownership, technical capability and overall financial position of the construction company prior to granting Project Related Finance facilities.
- In case study B, although the construction company enjoyed a good relationship with the bank, it was requested to provide an update on its financial position before a decision to provide the required credit lines was made. The company’s audited financial report was also requested by the lending bank in case study C.
Hypothesis 5 (bank's concern over the financial standing of the Employer, and the borrower's technical capability to perform)

- The bank studied the tender documents and assessed the technical capability of the Contractor in case study A.
- In case study B, the bank had good knowledge of the borrower's capability due to their long relationship. However, it asked for information about the project prior to concluding the Project Related Finance agreement.
- In case study C, the bank assessed the contractor's capability and requested to examine relevant documents.

Hypothesis 6 (monitoring the project progress payments as per its cash flow)

- The borrowers in all three case studies supplied the banks with project cash flows, and the bank's representatives monitored their progress accordingly.

Hypothesis 7 (asserting that lending banks will not surrender all their traditional rights of recourse)

- In case study A, the granting of facilities was made conditional to providing the bank with personal guarantees of all partners of the firm, and keeping a fixed deposit of Dh2 million under lien. Margins of 10% on OD (PPC) and 25 per cent on the retention guarantee were also stipulated.
- In case study B, corporate guarantees and mortgage of plant were required. Margins of 15 per cent on OD (PPC) and 5 per cent on PB were also specified.
- The corporate guarantee from the ultimate holding company, covering the entire exposure was demanded as recourse in case study C.

The different cash flow profiles (shown on S-curves in Figures 7.3, 7.6 and 7.8) for the different case studies reinforced the view that cash flow profiles have different characteristics which depend upon the type of project and geophysical factors.
CHAPTER EIGHT

QUESTIONNAIRE ANALYSIS AND TESTING THE HYPOTHESES AND ASSUMPTIONS
CHAPTER 8  QUESTIONNAIRE ANALYSIS AND TESTING
THE HYPOTHESES AND ASSUMPTIONS

8.1 Introduction

The use of statistical techniques to establish trends, to prove or disprove relationships and to check on work progress is a major part of the research process. In construction management, statistics are always used to explain records over the years whether in financial terms, types, or volume.

The data gathered from the active and influential participants in finance and construction who participated in the research were directed at finding definitional criteria for Project Related Finance, testing the study's hypotheses, and examining contractors' choices of finance and the extent of their reliance on banks.

8.2 The choice of the statistical package

Samples must be chosen that are representative of a population if the following statistical analysis is to be valid. In this research all twenty banks that participated extended finance facilities to contractors as follows:

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>US $ MILLION</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>8 - 30</td>
</tr>
<tr>
<td>5</td>
<td>40 - 85</td>
</tr>
<tr>
<td>4</td>
<td>200 - 465</td>
</tr>
</tbody>
</table>

The thirty contractors that participated in the study had turnovers for 1992 as follows:

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>US $ MILLION</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>10 - 40</td>
</tr>
<tr>
<td>2</td>
<td>60 - 100</td>
</tr>
<tr>
<td>3</td>
<td>200 - 290</td>
</tr>
<tr>
<td>2</td>
<td>370 - 475</td>
</tr>
</tbody>
</table>

Lotus 123 Version 3.1 spreadsheet was used for data storage and retrieval. MS Word Version 6 package was used for the presentation of the results. Testing the
relationship between Contractors' Turnover and Bank Finance Percentage was performed using SPSS for Windows Version 6 and the following variables were created.

**Table 8.1 Variables used for testing the relationship between contractors' turnover and bank finance percentage**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Type</th>
<th>Length</th>
<th>DP</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPANY</td>
<td>Letter(s) to represent company</td>
<td>STRING</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>TURNOVER</td>
<td>1992 turnover of company in million US $</td>
<td>NUMERIC</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>BANK-FIN</td>
<td>Percentage of finance due to banks</td>
<td>NUMERIC</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>OWN-FIN</td>
<td>Percentage of finance due to company</td>
<td>NUMERIC</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>GROUP</td>
<td>Size of turnover in millions US $ S and L</td>
<td>NUMERIC</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

The data shown in Table 8.2 was analysed and the results summarised. A scatterplot was produced of turnover against banks finance percentage to see if there appeared to be any relationship between the two. The results are shown in Figure 8.1. It would appear from studying the graph that no linear relationship exists between the two variables. To test this theory, Pearson's correlation coefficient was computed, and the results were as follows:-

BANKS FINANCE %

TURNOVER  
-.0702  
( 28)  
P = .723

(Coefficient / (Cases) / 2-tailed Significance)

This indicates no correlation between the two variables.

Examining the data more closely, there are some companies with an extremely large turnover compared with the median. Companies g, n, p, and q had a turnover in 1992 in excess of US $200 million. There were some whose turnover was close to the
median, i.e. companies k and y. All the others, a total of 24 companies, had a turnover of between 11 and 37 million US dollars. The companies were grouped as small and large in respect of turnover. A scatterplot was produced showing the results for just the companies with a small turnover. This is shown in Figure 8.2.

Correlation coefficient for companies with small turnover gave the following results:

**Excluding companies with turnover > $40 million**

<table>
<thead>
<tr>
<th>TURNOVER</th>
<th>BANK FINANCE %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.0465</td>
</tr>
<tr>
<td></td>
<td>( 22)</td>
</tr>
<tr>
<td>P = .837</td>
<td></td>
</tr>
</tbody>
</table>

(Coefficient / (Cases) / 2-tailed Significance)

This indicates that even when outliers are excluded, there is still no correlation between turnover and percentage of finance due to banks.

T-tests were carried out as they can deal with unequal group sizes and the results showed that the mean percentage of finance from banks is not significantly different since p = 0.097 between large and small turnover companies (see Appendix D).

The Mann Whitney (non-parametric) test is used where there are violations of the following requirements for a parametric (student t) test.

- Scale of data must be at least interval (continuous variable). This has not been violated in this data.
- Ostensibly from normal distribution. This has been violated.
- Homogeneity of variance (the variances are different in this data but not significantly different - see Levine’s test in Appendix D)

Therefore the Mann Whitney test was used as this test is “distribution” free. This test ranks all the data (bank finance percentages) and separates the ranks according to the criteria for large and small, i.e. group 2 and group 1 respectively. It then tests these
ranks to see if they are significantly different. In this case there is no significant difference between the ranks of the large and small turnover companies thus supporting the t-test test that the amount of finance given by banks to small companies is not significantly different from that given to large companies.

From the above results it can be concluded that from the data provided there is no linear relationship between company turnover and percentage of finance due to banks.
Figure 8.1 Scatterplot of turnover vs banks finance percentage

Scatterplot of Turnover vs. Banks Finance %

Turnover Size
- large
- medium
- small

1992 Turnover US$ Million

Banks Finance Percentage
Figure 8.2 Scatterplot of turnover vs banks finance percentage showing small turnover only
Table 8.2 Turnover vs banks finance percentages

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>1992 TURNOVER</th>
<th>FINANCE PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>US$ MILLION</td>
<td>BANKS' OWN</td>
</tr>
<tr>
<td>a</td>
<td>11.79</td>
<td>20  80</td>
</tr>
<tr>
<td>b</td>
<td>30.89</td>
<td>60  40</td>
</tr>
<tr>
<td>c</td>
<td>275</td>
<td>10  90</td>
</tr>
<tr>
<td>d</td>
<td>12.07</td>
<td>95  5</td>
</tr>
<tr>
<td>e</td>
<td>30</td>
<td>70  30</td>
</tr>
<tr>
<td>f</td>
<td>32.76</td>
<td>76  24</td>
</tr>
<tr>
<td>g</td>
<td>378.9</td>
<td>100 0</td>
</tr>
<tr>
<td>h</td>
<td>19.66</td>
<td>70  30</td>
</tr>
<tr>
<td>i</td>
<td>12.6</td>
<td>85  15</td>
</tr>
<tr>
<td>j</td>
<td>36.79</td>
<td>100 0</td>
</tr>
<tr>
<td>k</td>
<td>75.84</td>
<td>100 0</td>
</tr>
<tr>
<td>l</td>
<td>12.2</td>
<td>95  5</td>
</tr>
<tr>
<td>m</td>
<td>33.70</td>
<td>0 100</td>
</tr>
<tr>
<td>n</td>
<td>474.37</td>
<td>80 20</td>
</tr>
<tr>
<td>o</td>
<td>11.11</td>
<td>25 75</td>
</tr>
<tr>
<td>p</td>
<td>207.9</td>
<td>N.A. N.A.</td>
</tr>
<tr>
<td>q</td>
<td>255</td>
<td>10 90</td>
</tr>
<tr>
<td>r</td>
<td>14.82</td>
<td>95 5</td>
</tr>
<tr>
<td>s</td>
<td>15.75</td>
<td>15 85</td>
</tr>
<tr>
<td>t</td>
<td>27</td>
<td>N.A. N.A.</td>
</tr>
<tr>
<td>y</td>
<td>15.4</td>
<td>75 25</td>
</tr>
<tr>
<td>v</td>
<td>30.5</td>
<td>85 15</td>
</tr>
<tr>
<td>w</td>
<td>36.7</td>
<td>80 20</td>
</tr>
<tr>
<td>x</td>
<td>27.3</td>
<td>80 20</td>
</tr>
<tr>
<td>y</td>
<td>68.5</td>
<td>70 30</td>
</tr>
<tr>
<td>z</td>
<td>18</td>
<td>75 25</td>
</tr>
<tr>
<td>aa</td>
<td>11.75</td>
<td>70 30</td>
</tr>
<tr>
<td>ab</td>
<td>11.2</td>
<td>75 25</td>
</tr>
<tr>
<td>ac</td>
<td>11</td>
<td>70 30</td>
</tr>
<tr>
<td>ad</td>
<td>11.5</td>
<td>70 30</td>
</tr>
</tbody>
</table>
8.3 Interpretation of the questionnaire

The information derived from the answers to the questionnaires was compiled in four tally charts showing the assumptions, the hypotheses and both contractors' and bankers' acceptability of risk. The data were tallied and a comparison was made to establish the final result. This method of interpretation was conceived while the development of the questionnaire was being considered (see 2.2 Development of the questionnaire).

8.4 Testing the hypotheses

The findings of the questionnaire, and the field interviews (which are graphically represented in Figure 8.3), clearly supported the study's hypotheses except in hypotheses 1 and 3. Appendix D contains the statistical analysis of the hypotheses.

Hypothesis 1, asserting that Project Related Finance is practised by contractors only to increase their borrowing capability and consequently to enhance their financial stability, was not supported. Only eight contractors agreed (Appendix A-Contractors' Question 7). Although twelve bankers agreed in the questionnaire that contractors would generally resort to Project Related Finance to increase their borrowing capability (Appendix A - Banks' Question 8), six out of the eight bankers interviewed who actually practise Project Related Finance did not support the hypothesis.

Contractors' Question 17 and Banks' Question 21 (see Appendix A) show that Hypothesis 2, concerning the treatment of risk exposure, was supported with bankers accepting less risk and allowing more 'Negotiable'. Fifteen types of risks were investigated reflecting the more cautious attitude of banks, contrary to the contractors who accept more risk and allow less 'Negotiable'. This is graphically represented in Figure 7.1.

Hypothesis 3, concerning the transfer of risk, was not supported. Eleven banks did not consider the assignment of the project's proceeds as enough security (Banks' Question 10). Twenty contractors declared that they offered other forms of securities than the assignment of progress payments in order to obtain Project Related Finance (Contractors' Question 11). Five out of eight bankers and eighteen out of twenty contractors interviewed did not support it.
Hypothesis 4, establishing ownership, adequacy of working capital and gearing as a prerequisite for extending Project Related Finance, was clearly supported by nineteen out of twenty banks (Banks' Question 5). Twenty out of thirty contractors supported establishing ownership and the investigation of adequate working capital and gearing (Contractors' Question 9).

Hypothesis 5, directed at the bank's concerns for the financial standing of the Employer and the contractor's capability to perform, was wholly supported by all twenty banks (Question 5). It was further confirmed by the eight banks interviewed.

Hypothesis 6, concerning monitoring the project's progress payments by the lending bank to match the cash flow, was supported by eighteen out of twenty banks (Banks' Question 9) and twenty-five out of thirty contractors (Contractors' Question 9).

Hypothesis 7, asserting that lending banks will not surrender all their traditional rights of recourse to the borrower in favour of project progress payments, was supported by eleven banks out of the total of twenty that participated (Question 10). This was further verified by seven out of eight banks in the interviews.

A statistical analysis for the hypotheses can be found in Appendix D.

The validated research hypotheses can be summarised as follows:

- Lending banks are more cautious than contractors and will view their risk exposure as the main criteria before participating.
- Lending banks analyse the ownership structure and consolidated accounts supplied by the contractor to satisfy themselves that its ownership, working capital and gearing are acceptable.
- Lending banks need to satisfy themselves about the Employer's financial standing and the contractor's capability to execute the project before they agree to extend facilities.
• Lending banks monitor the progress of the project to ensure that progress payments are as per projected cash flow and may take precautionary measures if the borrower's cash flow proves inadequate.

• Lending banks must have the right of recourse in case the project runs into difficulties.

8.5 Testing the assumptions

The formation of research hypotheses and definition criteria about Project Related Finance and testing them was one of the six general objectives of this research (see 1.2 The objectives of the research). Nine assumptions were made that best described the term “Project Related Finance” and were presented in Part I of the questionnaire which was completed by twenty bankers and thirty contractors. The data obtained from the questionnaire was further verified by the interviews conducted with eight selected banks and twenty contractors (Interview Guide - Appendix B).

The same nine assumptions were put forward in the form of questions asked by the author in the interviews that were conducted with eight bankers and twenty contractors chosen from those who responded to the questionnaire.

The analysis of the answers revealed that both bankers and contractors agreed upon the following assumptions:

• Number 1 which stated that Project Related Finance is a form of lending designed to help both the borrower and the lending bank make the most out of the investment by linking loan repayments to the construction project's own cash flow;

• Number 2 where Project Related Finance differed from company and corporate lending because the project loans were not completely secured by the value of the assets being financed and that the lending bank should, therefore, consider progress on the project itself for returns and share major business risks;
• Number 3 whereby Project Related Finance involved assigning the project's earnings to the lending bank and may compel the bank to participate in controlling the project;

• Number 5 which showed Project Related Finance as the means to bring together a complete package of financial commitments from the lending bank, and guarantees from the borrower to ensure successful completion of the construction project;

• Number 6 which stated that Project Related Finance structure was more advantageous to the lender through its facility to control risks by separating the project's revenue from revenue of other operations.

The bankers and contractors disagreed upon the following assumptions:

• Number 4 that described Project Related Finance as purely another form of bank loan designed to increase the borrowing capability of the construction contractor;

• Number 8 which stated that Project Related Finance meant a higher debt-to-equity ratio resulting in a less risky investment for the borrower due to the absence of direct financial guarantees;

• Number 9 which showed Project Related Finance as more attractive to lending banks than other financial methods.

However, Assumption Number 7, which would allow the borrower not to guarantee all debts because of the lending banks' reliance on the projects' performance for risk protection, was given a guarded Fair Assumption rating.

The final analysis of the answers showed that although the bankers differed from the contractors in the intensity of their agreement or disagreement, they all agreed upon the same five assumptions, disagreed on the same three and thought one was a fair assumption out of the total of nine (Appendix A - Answers to the Questionnaire). These same results were confirmed in the interviews which can be seen graphically in Figure 8.4.
Figure 8.3 Verification of hypotheses by interviews

**HYPOTHESES VERIFICATIONS (CONTRACTORS)**

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>No. of Contractors Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>No 1</td>
<td>20</td>
</tr>
<tr>
<td>No 2</td>
<td>18</td>
</tr>
<tr>
<td>No 3</td>
<td>14</td>
</tr>
<tr>
<td>No 4</td>
<td>12</td>
</tr>
<tr>
<td>No 5</td>
<td>10</td>
</tr>
<tr>
<td>No 6</td>
<td>8</td>
</tr>
<tr>
<td>No 7</td>
<td>6</td>
</tr>
<tr>
<td>N/A</td>
<td>2</td>
</tr>
</tbody>
</table>

**HYPOTHESES**

- Hypotheses No. 5 and No. 7 are directed at lenders.

**HYPOTHESES VERIFICATIONS (BANKERS)**

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>No. of Bankers Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>No 1</td>
<td>8</td>
</tr>
<tr>
<td>No 2</td>
<td>7</td>
</tr>
<tr>
<td>No 3</td>
<td>6</td>
</tr>
<tr>
<td>No 4</td>
<td>5</td>
</tr>
<tr>
<td>No 5</td>
<td>4</td>
</tr>
<tr>
<td>No 6</td>
<td>3</td>
</tr>
<tr>
<td>No 7</td>
<td>2</td>
</tr>
</tbody>
</table>

- Hypotheses: [Agree] [Disagree]
Figure 8.4 Verification of assumptions by interviews

ASSUMPTION VERIFICATIONS (CONTRACTORS)

ASSUMPTION VERIFICATIONS (BANKERS)
8.6 Definition of Project Related Finance

The research's definition of Project Related Finance, after disregarding the rejected three assumptions Numbers 4, 8 and 9 and accepting as fair assumption Number 7 that not all debts are guaranteed by the borrower, is as follows:

*Project Related Finance is the means to bring together a complete package of financial commitment from the lending bank and certain guarantees from the borrower in order to execute a construction project through linking the loan repayments to the project's own cash flow.*

8.7 Finance analysis

Investigating the financial condition of a contracting company is the major item in the contractor evaluation process. The Credit Evaluation and Approval Process flow chart (Figure 8.5) illustrates that a request for finance can be turned down at the outset if the preliminary financial appraisal is not favourable. All the banks that participated in this research confirmed that they study the balance sheet and capital structure of the borrowing organisation before extending finance facilities to the project. Eighty-five per cent of these banks confirmed that they study the cash flow of the parent company. Seventy-three per cent of contractors that participated confirmed they included their balance sheet and 37 per cent of them included the company cash flow with their request for finance.

Data required for the analysis are obtained from the contracting company's audited annual report for the three years preceding the request date. A spreadsheet (Table 8.3) has been created for the purpose of this analysis into which the figures obtained for the three year period can be entered. This format allows for the computation of 14 ratios considered important in assessing the financial condition of a typical construction company. A cash flow statement is then computed as in the format in Table 8.4.

The analysis includes a brief on each of the following:
• General comments on the financials (dependability)
• Revenues/profitability (operating performance)
• Liquidity/inventory (receivables)
• Gearing (leverage)
• Cash flow
• Consolidated position
• Risk Rating (RR)

The analysis should be concluded with a brief note on the company's strengths and weaknesses, if any.
Figure 8.5 Credit evaluation and approval process

1. Customer request finance facilities
   - Preliminary financial & market appraisal
     - Is customer acceptable?
       - No → Decline
       - Yes → Detailed financial, technical & market evaluation
         → Compile proposal for submittal to Credit Committee
           → Committee's decision
             → No → Decline
             → Yes → Sign agreement and open Project Account
               → Release facilities
## Table 8.3 Analysis of company accounts (spreadsheet)

### SPREAD SHEET X Contracting Company

#### Type of Statement: audited

<table>
<thead>
<tr>
<th>Type of Statement</th>
<th>31.12.90</th>
<th>31.12.91</th>
<th>31.12.92</th>
</tr>
</thead>
<tbody>
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### INCOME STATEMENT

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### RATIOS

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Table 8.4 Company cash flow statement

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8.8 Summary

The data gathered from the questionnaire was analysed and the results were used to test the research's hypotheses and arrive at a definition of Project Related Finance. This was further verified by means of 'focused interviews' held with bankers and contractors who use this form of finance. The questionnaire analysis further revealed the high level of importance lending banks place on investigating the financial condition of the contracting company, hence a method of financial analysis is devised.
CHAPTER 9 GUIDELINES FOR ADOPTING PROJECT RELATED FINANCE

9.1 Introduction

The questionnaire results (Appendix A-Questions 3 & 4-contractors) indicate a strong preference among contractors for adopting Project Related Finance. Twenty-two out of the thirty contractors who responded to the questionnaire use Project Related Finance. Bankers are also keen as nine out of the twenty respondents practise it (Appendix A-Question 7-bankers). This indicates that financing contractors on a project-by-project basis is a viable and popular alternative to corporate finance.

The research identified the risks that are most common to construction and presented them in the questionnaire for investigation. It transpired from the questionnaire results (Appendix A-Question 21-bankers and Question 17-contractors) that banks accept far less risk than contractors (see Figure 7.1). This confirms that banks regard construction contracting as a high risk business.

To help remedy this situation, it is necessary to positively influence the perceived opinion of bankers towards lending to contractors. This can be achieved by explaining the basics of Project Related Finance and by offering certain guidelines for its implementation thus meeting the final objective of the research as set out in 1.2.

9.2 Basics of Project Related Finance

The approach to financing the execution of a construction project using Project Related Finance facilities is to isolate the project and treat it as a separate entity from the parent company. This arrangement helps the lending bank follow the project’s progress and ensures that their loan is used only for the purpose for which it was
granted. The borrower, on the other hand, benefits in obtaining the much-needed finance facilities by offering the lender the tangible security of its continued performance in the project which lends itself to analysis and evaluation. The project should, therefore, be separated from other corporate parent operations and, as such, has its own bank account and accounting procedures.

The primary source of repayment of the loan is the project’s monthly progress payments which should be paid into the project’s account (see Figure 9.1). These payments depend upon the contractor’s performance and should therefore be backed up by a secondary source such as a mortgage of assets and/or personal guarantees.
Figure 9.1 Project Related Finance chart for the execution of one project
Before lending on a project-by-project basis, the bank concerned will need to gather and study some basic information about the borrowing company, such as:

- details of its board of directors;
- the history and legal status of the business;
- the history of its relationship with the bank and the conduct of their existing accounts;
- a summary of bank trade and agency checking;
- the status of projects in hand;
- management evaluation;
- a report summarising their technical capability;
- regulatory and competitive environment and condition of the construction industry at the time;
- the company's strengths and weaknesses;
- the company's and industry's future outlook;
- exposure analysis and risk rating;
- the company's annual reports with brief comments on them;
- its operating performance and general profitability;
- its liquidity (receivables/work in progress);
- its gearing (leverage); and
- its cash flow.

9.3 Guidelines for lenders

Decision-making in bank lending can be categorised into three main areas.

- Top level corporate strategic decisions.
  At this level the bank's lending policy and the overall relationship between its major activities, whether commercial, foreign or retail, are formulated.

- Business level strategic decisions.
  At this level decisions are taken within the strategy for corporate lending. Business strategic decisions are concerned with the balance between the types of industries and businesses, and the content of the bank's lending portfolio.

- Individual lending decisions.
These are guided by the two strategic levels of decision making. Individual lending proposals would be appraised at this level accordingly.

Strategic decisions are dependent on many factors that cannot be pre-determined. A high degree of knowledge, experience and expertise combined with a certain degree of vision are necessary qualities to initiate such decisions.

Once a bank makes a strategic decision to lend to construction contractors, a link between this strategic decision and the evaluation of individual lending proposals must be made. This can take the form of directives from the Chief Executive Officer to credit managers requiring them to work within an overall, well-defined portfolio fixing:

- the limits to construction lending as a whole and as set by the bank’s lending policy; and
- the maximum exposure to one single customer as set by the bank’s lending policy.

Individual lending proposals are then evaluated by examining a number of pre-defined criteria as discussed in 8.6. The results of such examinations are combined to produce a decision for or against such proposals.

The research revealed that lending banks have five main areas of concern when dealing with construction companies as detailed below.

1. **Financial strength of the construction company**

   Before actually committing themselves to extending finance facilities to a contracting firm to execute a construction project, all twenty banks that participated confirmed that they study the borrower’s balance sheet and profit and loss account. Seventeen studied the cash flow of the parent company, and eighteen studied the project’s cash flow. According to McMeen (1992, p.1), “Financial Statement analysis is a key part of the process of determining debt repayment capacity”.

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Banks also study the company’s asset values very carefully. The key concept in determining asset value is that an asset’s value is a function of its earning power. Accounting values are examined with caution or disregarded.

2. **Technical expertise**
   Lending banks satisfy themselves as to the relevant experience and skills of the company’s individuals, and their past performance in similar projects. All twenty banks who responded to the questionnaire confirmed this view. After satisfying themselves that there is enough margin in the contract price, the bank’s lending officers make a thorough appraisal of the project management team. The contractor’s team competence is a key issue when considering the risks of cost overruns or delays and subsequent liquidated damages.

3. **Capability and performance track record of the construction company**
   A thorough investigation of the technical capability of the contracting company as a whole is an essential prerequisite of Project Related Finance. This was confirmed by all respondent banks. Technical capability of the contracting company is normally ascertained by an in-house engineer or an independent professional consultant.

4. **Integrity of the owners/directors of the company**
   A prudent lender will seek to ensure that the borrower is capable and prepared to meet his debt obligations. All respondent banks investigated the status of the company’s owners. The idea of “name lending” was suggested in all eight interviews and bankers confirmed that they looked “favourably” on proposals presented on behalf of well known customers.

5. **Integrity of the Employer**
   The financial standing of the project owner is of paramount importance. As seen from certain Conditions of Contract, discussed in Chapter 5, the Employer’s default can mean total ruin to contractors with a tight working capital.
As can be seen, certain criteria are objective and readily quantifiable, such as financial strength and technical capability. This means that they can be computerised for ease of feeding information and retrieval of same when required. For example, financial analysis and accounting data can be summarised on a spreadsheet (such as in Tables 8.3 & 8.4). Reporting on technical expertise can also be done by designing a format using a suitable package.

There are also other issues that must be considered by the lender. These include the adequacy of contract documents and the volume of possible Variation Orders that could have a substantial effect on the financing structure. The cost estimate and projected cash flow based on a contract's start date and duration must also be studied. A positive cash flow is the first way out of a project related loan.

**Conditions**

The borrower must agree to:

- assign Progress Payments unconditionally and irrevocably to the bank (primary source);
- provide directors' guarantees and mortgage of assets (secondary source);
- provide a written confirmation of the absence of liens or charge on assets presented to the bank as security and to undertake not to create lien or mortgage or encumbrance over said assets without prior consent of the bank;
- undertake to maintain a certain level of net working capital, current and gearing ratios as generally accepted by accounting principals and practices as long as credit facilities are extended;
- maintain its assets, liened or not, properly and adequately insured against all standard risks;
- pay an agreed project management fee;
- pay all projects' proceeds in the project's account with the bank.

The loan facilities, once agreed, are conditional that the bank's representative makes regular site inspections to evaluate progress and report to the bank on the amount of work done compared to the amount of work planned as projected in the cash flow and
execution programme for the period. He will inform the bank early if the contracting company are not performing as they should so that corrective measures can be taken. In the event of meeting with unforeseen problems, the bank’s loan manager can evaluate the situation and make the necessary recommendations.

9.4 Guidelines for borrowers

The most crucial step in Project Related Finance borrowing is selecting the right bank. Banks generally consider construction contracting as a high risk business. Two banks out of the twenty that participated in this research considered financing construction projects in relation to their overall business as very important, three as important, eight as fairly important, six as possibly important and one as unimportant. Thirteen out of the twenty confirmed that they had a specialised department to handle finance facilities for construction contractors and nine extended Project Related Finance that is specific to the construction project itself.

Both the questionnaire results and the interviews that followed confirm that banks viewed financing the construction phase as risky but some banks are more willing to finance it than others.

A contractor’s finance requirements can be summarised as follows:

- low interest rate;
- low loan management cost;
- simplicity of loan structure and minimum of formalities;
- early commitment; and
- flexibility and speed of assistance when needed.

Project Related Finance is generally agreed upon at an early stage of the project cycle, i.e. during the tendering stage. The chosen bank is approached by the contractor at the outset to supply a bid bond, and to extend facilities if awarded the contract. The required facilities, as set out in the contractor’s initial request, may include all or some of the following:
- Advance Payment Guarantee;
- Performance Guarantee;
- Letters of Credit Usance/Acceptance;
- Overdraft;
- Discounting of Progress Payment Certificates; and/or
- Retention Guarantee.

Assessment by the chosen bank of a contractor's credit quality is always related to the latter’s financial strength with particular attention to its working capital, current and gearing ratios. Technical expertise, experience and performance track record and the contractor’s reputation are investigated thoroughly. A financially strong contractor is not necessarily a risk-free borrower. The study found that all banks assessed the technical capability of the contractor before they granted facilities. The condition of the construction industry as a whole and the market position of the borrower at the time of the request are also taken into consideration by the bank.

To obtain facilities a contractor must provide evidence that its business is sound and well managed so that the bank’s assessment of the risks involved comes within the acceptable limits it allows.

9.5 Summary

The basic elements of Project Related Finance, which also offer guidelines to lenders, are:

- Firstly, investigating the financial condition of the contracting company;
- Secondly, the isolation of the project, the execution of which to be financed, and treating it as a separate entity from the parent company’s other operations;
- Thirdly, assigning the project’s monthly progress payments to the lending bank. These progress payments being the primary source of repayments should be backed up by a secondary source of sufficient pay-back potential as a means of recourse;
• Fourthly, the technical capability, the quality of the material and human resources of the contracting company and its previous experience in similar projects to be investigated to ensure timely completion within the budget.

• Fifthly, the financial standing of the Employer to be ascertained to avoid default.

Guidelines to borrowers, on the other hand, are the right selection of the bank that offers the best package. While certain banks view construction contracting as a risky business to be avoided others consider it as an important part of their portfolio diversification.
CHAPTER TEN

RESEARCH FINDINGS AND CONCLUSIONS
CHAPTER 10 RESEARCH FINDINGS AND CONCLUSIONS

10.1 Introduction

The literature review that was conducted after establishing the research objectives and methodology, and choosing the locality, started with the historical background to the subject. It then looked at the common elements of financiable projects and extending credit. Since the majority of construction contracts are won through competitive tendering, a thorough review of the estimating and tendering process and the relevant conditions of contract got under way. A comparison between local and international conditions of contract was established. The literature treatment of risks in construction and the management of such risks was researched. The research's assumptions and hypotheses were then formulated. In order to obtain data, a questionnaire was formulated and sent out to both lenders and borrowers. Interviews were conducted with bankers and contractors, and three case studies representing Project Related Finance were selected and analysed.

10.2 Conclusions of the research

The main objective of this research was to investigate bank finance for the execution of construction contracts. This led the research to investigate contractors' borrowing from banks and, banks' vetting procedures to ensure maximum safety for their investments. The different approaches practised by contractors to raise credit necessitated the grouping of borrowings into two: company-based loans and project-based loans. The literature treatment of the former was investigated before the research was directed at the latter defining it as “Project Related Finance”.

Definition of the process was made possible from the answers to nine assumptions made that best describe the subject and put forward in a questionnaire survey which was subsequently completed by twenty bankers and thirty contractors.
The literature review enabled the research to put forward seven hypotheses explaining the mechanics of Project Related Finance. These hypotheses were tested by means of the questionnaire survey and field interviews. The final outcome was the validation of five hypotheses as outlined below.

- Hypothesis 2, defining risk exposure of lending bank.
- Hypothesis 4, establishing ownership, adequacy of working capital and gearing of parent company.
- Hypothesis 5, establishing the project owner’s net worth and the capability of the borrower to perform.
- Hypothesis 6, monitoring the progress payments to ensure they are as per the project cash flow.
- Hypothesis 7, that lending banks will not surrender all their traditional rights of recourse in favour of project progress payments.

The two hypotheses that were not supported were

- Hypothesis 1, the assertion that contractors resort to Project Related Finance to increase their borrowing capability.
- Hypothesis 3, the debt risk of the borrower to be significantly less than the loan security to the lender, and the treatment of receivables from the construction project as a substitute for the credit-worthiness of the borrower.

The research was then directed at the investigation of contractors’ choices and decision criteria when considering a Project Related Finance package, and the decision criteria of the lending bank for granting the required facility.

**For contractors it is shown that:**

- out of the thirty contractors who participated in the research, seventeen considered Project Related Finance as very important, five as important and three as least important. Five contractors did not comment;
- twenty-two contractors out of thirty used Project Related Finance;
on average contractors rely on banks to cover 66.28 per cent of the finance required to execute construction projects. This took the form of clean overdrafts, progress payments discounting, letters of credit and guarantees;

- there is no correlation between the size of contractor turnover and percentage of finance due to banks. No linear relationship exists between the two variables;
- 66.67 per cent of contractors submitted the tender price breakdown to lending banks for their appraisal;
- 83.33 per cent of contractors submitted the projected cash flow;
- 66.67 per cent submitted the balance sheet and capital structure of the company;
- 66.67 per cent submitted detailed information about the ownership of the company; and
- 76.67 per cent submitted information about the Employer.

The securities offered by contractors were that:

- thirty-three per cent offered assignment of Progress Payments;
- twenty-seven per cent personal guarantees;
- twenty per cent corporate guarantees;
- twenty per cent fixed deposits under lien.

Acceptability of risk:

- the weighted average on the Acceptability Scale varied from 470 acceptable to 190 unacceptable (see Table 7.3).

For banks it is shown that:

- out of the twenty banks that participated, two considered Project Related Finance as very important, three important, eight fairly important, six possibly important and one unimportant.
- thirteen banks had specialised departments to handle finance for construction contracts;
- forty-five per cent of banks extended Project Related Finance to contractors
- the limits that banks are prepared to finance contractors varies from 20 to 80 per cent of the latter's turnover;
• there is no correlation between the percentage of bank finance and the size of contractor turnover;
• all banks investigate the borrower’s technical capability and experience, their balance sheet, the adequacy of their working capital, ownership, and the financial standing of the Employer before extending finance;
• seventy-five per cent of banks study the feasibility of the project;
• seventy per cent investigate tender make up;
• ninety per cent study the cash flow of the project;
• eighty-five per cent study the cash flow of the parent company; and
• eighty-five per cent of banks monitor project’s progress during construction.

Loans given
Over draft facilities are given by 90 per cent of banks. L/C facilities, Bid Bonds, Performance Bonds, and Advance Payment Guarantees are made available to contractors by 85 per cent of banks. Maintenance Guarantees are given by 80 per cent of banks.

Securities requested by banks
While 45 per cent of banks considered that irrevocable assignment of the project’s receivables in the bank’s favour afforded enough security, the rest specified corporate and personal guarantees, and mortgage of assets as necessary security. They all agreed that the contractor’s good performance was the real security.

Acceptability of risk
The weighted average on the Acceptability Scale varied from 145 acceptable to 325 unacceptable (see Table 6.2).

10.3 Recommendation to industry
This research has been conducted with special attention given to the mutual needs of banks and the construction industry in funding the execution phase of construction.
projects. The most common finance method contractors use internationally, which is basically a combination of trade credit, delay payments to sub-contractors, front-end loading and the full utilisation of working capital, has demonstrated its shortcomings in almost all instances of contractor failures. Tracking of the relevant literature confirms this phenomenon and suggests that contractors appear to rely on self-finance for a proportion of the construction costs. The research proved this to be true but could not find any correlation between these proportions and the contracting companies’ size or turnover. The research found that, on average, banks provided 66.28 per cent of finance required by contractors during the construction and defects liability period. This constitutes a massive investment by banks in the construction industry. To minimise risk and achieve good returns on this investment, it is recommended that banks analyse contractor loans and treat them like all other loans to determine their viability and their pay back potential. This risk evaluation analysis can be described as a process that passes through three main phases:

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Market Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 2</td>
<td>Contractor Evaluation</td>
</tr>
<tr>
<td>Phase 3</td>
<td>Project Analysis</td>
</tr>
</tbody>
</table>

Risks associated with each phase should be individually analysed by banks before they enter into the business of contractor finance.

**Phase 1. Market research**

Industry and economic conditions:
The overall state of the construction industry and the prevailing economic conditions are of paramount importance and should be monitored constantly. They can be a deciding factor in rejecting outright a quality credit proposal. Banks do not look favourably upon requests for new credit lines when the construction cycle is in decline or the economy in recession.

Nature of demand:
The choice of the Employer, and striking a balance between the private and public sector, is always taken into consideration to reduce payment risk. It is recommended
that contractors should be more particular about choosing their employers to avoid failure. A good mix of public and private sector projects is also recommended.

Regulatory conditions:
The effects of possible changes in importation, currency and tax regulations should be studied carefully especially where the project’s foreign content risk is high.

Laws and legal procedures:
It is recommended that laws and legal procedures are examined to see if they provide adequate and fair protection to the borrower and whether something can be done to reduce risks associated with litigation.

Materials and labour:
Scarcity of construction materials can present major problems especially where the project is located in a remote area requiring extended supply lines. Possible restrictive labour laws must be investigated.

Phase 2. Contractor evaluation

Technical capability:
A report on the technical capability of the contractor must be compiled detailing all the resources available, including a breakdown of manpower, plant list, workshops, offices, labour camps and accommodation. A list of projects completed in the past three years, with start and finish dates, and another for projects in hand which highlights each contract duration and percentage completion, are a useful means of assessing the contractor’s performance and ability to take on more work.

Financial performance:
Banks need to see a good track record of financial performance and cash management. Financial analysis should be carried out under the following headings:

- Turnover
- Liquidity
- Gearing (Leverage)
* Cash flow
* Future outlook

Data regarding the above can be obtained from the contractor’s audited annual reports for the three years preceding the evaluation, together with some intelligence gathering that is normally available to banks. A method for financial analysis is devised in Chapter 8.

**Phase 3. Project analysis**

The project itself must be of a similar nature to those that have been successfully executed by the borrower. It is recommended that the scope of the works, its duration and value are studied with the borrower’s capability in mind. Project analysis should include examination and reporting on:

- Employer;
- Cost components;
- Projected profit;
- Execution programme;
- Conditions of contract and terms of payments;
- Duration of contract;
- Cash flow chart; and
- Organisation chart.

Once the risk evaluation process has been completed a clearer picture on the viability of extending credit to the particular contractor emerges.

The foregoing recommendations, when implemented, will act as confidence building measures between contractors and bankers, whether they look for new relationships or develop existing ones. They could positively influence the opinions of bankers regarding contractors, giving industry the benefit of a more stable relationship. This relationship would then be built on pre-determined values that lend themselves to proper analysis and evaluation. It is also recommended that a contracting company should cultivate long-term relationships with more than one bank in order to achieve its fullest potential. Long-term relationships are beneficial to both parties as they help
speed up the decision making process. This is more in line with current trends that advocate Total Quality Management and "partnering" where parties working closely together over long periods gain confidence and improvement in value of service.

10.4 Summary of research findings

To be able to make a general assessment of bank finance for construction contractors and to identify the methods used, an extensive literature review was undertaken. This was followed by the distribution of questionnaires to 320 contractors and 42 banks. Thirty of which were returned completed by contractors and twenty by bankers. Interviews were then held with twenty contractors and eight bankers.

The research identified the methods used and found that 73 per cent of contractors and 45 per cent of banks used Project Related Finance for financing the execution of construction projects.

The findings of the questionnaire and interviews were tested against the assumptions and hypotheses of the thesis. The findings agreed upon the same five assumptions, disagreed on three and thought one was a fair assumption. This led to achieving the study's definitional objective. The findings clearly supported five out of the seven hypotheses as detailed in Chapter 8.

The research discussed all the sources of finance available to contractors. It then classified finance as either company related, whereby the company agrees a certain general limit with the lending bank, or project related where the limits are agreed specifically for one project.

The questionnaire results revealed that seventeen out of thirty contractors considered Project Related Finance very important, eleven out of thirty considered company-guaranteed loans as important, and seven out of thirty thought mixing the two was
important. The degree of preference for Project Related Finance varied from nineteen out of thirty wholly in favour to twenty-one out of thirty with some reservations.

As for lenders, only one bank out of the twenty participated considered construction lending as unimportant. The degree of importance the rest placed on this line of business ranged from two considering it as very important, three as important, eight as fairly important and six considered it as possibly important.

The need to investigate contractors' management of tenders led the research to investigate the estimating and planning processes, dealt with in Chapter 4, and the conditions of contract that are currently used (discussed in Chapter 5).

The research found that contractors expose themselves to more risks when working according to conditions of contract which restrict the powers of the Engineer.

The questionnaire results revealed that fourteen out of twenty lending banks investigated the tender make up of the project. It also found that eighteen out of thirty contractors use in-house financial experts to study and handle their financial needs.

The financial cycle of three different civil engineering projects was examined closely from award to completion. The conclusions of the findings highlighted the need for finance for the execution of all projects. The value of the total limits relative to the contracts' costs that were agreed with the bank were 44.05 per cent (Case Study A), 32.9 per cent (Case Study B), and 97.04 per cent (Case Study C). This established that the progress of the construction project was heavily influenced by bank finance.

The research was then able to develop guidelines for lenders to help in the decision-making process, and to borrowers to identify the areas that concern bankers most when lending to contractors.

These guidelines were presented for validation at interviews with five contractors selected at random from Table 7.1 (Contractors Participated in the Survey), and with
five bankers selected at random from Table 7.2 (Banks Participated in the Survey). The interviews were conducted by the author at the interviewees' offices. Each interviewee was presented with the list of guidelines relevant to his group with the conditions and summary for validation. All interviewees were satisfied with the guidelines.

10.5 Further research

The subject of Project Related Finance in construction needs to be investigated more fully. This research revealed that there are certain areas in contractor finance that warrant further study. It will be useful to develop further the concept of financing of construction contractors on a project-by-project basis. This could be done by formulating more hypotheses and testing them by means of a larger number of interviews and questionnaires than was possible in this thesis. This could give rise to the formulation of a data base of the many variables in the decision making process of extending credit. The data base could then form the nucleus of an expert system that would be used by banks for the purpose of assessing credit proposals for construction contractors.
LIST OF REFERENCES
LIST OF REFERENCES


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Government Contracts: *General Conditions of Government Contracts for Building and Civil Engineering Work (GC/Works/1. U.K.*


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APPENDIX A

ANSWERS TO THE QUESTIONNAIRE
BANKS
BANKS' ANSWERS TO
ASSUMPTIONS ON PROJECT RELATED FINANCE
(TOTAL NUMBER PARTICIPATED : 20)

Scale

(1) AGREE
(2) FAIR ASSUMPTION
(3) DISAGREE

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project Related Finance is a form of lending designed to help both the borrower and the lending bank make the most out of the investment by linking loan repayments to the construction project's own cash flow.</td>
<td>13</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>2. Project Related Finance differs from Company and Corporate lending because the project loans are not completely secured by the value of the assets being financed. The lending bank must, therefore, consider progress on the project itself for returns and share major business risks.</td>
<td>13</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>3. Project Related Finance involves assigning the project's earnings to the lending bank and may compel the bank to participate in controlling the project.</td>
<td>13</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>4. Project Related Finance is purely another form of bank loan designed to increase the borrowing capability of the construction contractor.</td>
<td>5</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>
### Scale

(1) **AGREE**

(2) **FAIR ASSUMPTION**

(3) **DISAGREE**

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

5. Project Related Finance is the means to bring together a complete package of financial commitments from the lending bank and guarantees from the borrower to ensure successful completion of the construction project.

6. Project Related Finance structure is more advantageous to the lender through its facility to control risks by separating the project's revenue from revenue of other operations.

7. Project Related Finance allows the borrower not to guarantee all debts because the lending bank relies on the project's performance for risks protection.

8. Project Related Finance means a higher debt-to-equity ratio resulting in a less risky investment for the borrower due to the absence of direct financial guarantees.

9. Project Related Finance is more attractive to lending banks than other financial methods because of the anticipated higher income through larger margins and management fees.
PART 2

SURVEY OF PROJECT RELATED FINANCING PRACTICE

1. How important do you consider the financing of construction projects generally in relation to your overall business?

<table>
<thead>
<tr>
<th>VERY IMPORTANT</th>
<th>IMPORTANT</th>
<th>FAIRLY IMPORTANT</th>
<th>POSSIBLY IMPORTANT</th>
<th>UNIMPORTANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>8</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>


1990 - 1991: None answered

1991 - 1992: Varied from a minimum of $9.6 Million given by one bank to a maximum of $465.75 given by another.

3. Do you finance construction projects:

- [ ] 16 Nationally
- [ ] 4 Internationally

Please state most active locations

4. Do you have a specialized department to handle finance facilities for construction contractors?

- [ ] 7 YES
- [ ] 13 NO
5. Before extending finance facilities to construction contractors, do you investigate any of the following:

- Technical capability of the prospective borrower
- Borrower's relevant previous experience
- Adequacy of borrower's working capital
- Ownership of borrowing organisation
- Financial standing of the project owner
- Feasibility study of the project
- Tender make-up of the project
- Projected cash flow of the project
- Cash flow of parent company
- Balance sheet and capital structure of borrowing organisation

If you have any other requirement please state

6. Would you extend Project Related Finance facilities to a construction contractor before ascertaining his technical capability to execute the project?

[ ] YES

[ ] NO
7. Do you extend Project Related Finance facilities that are specific to the construction project itself and NOT linked to the parent company?

9 YES
11 NO

If yes, how do you protect your investment knowing that the contractor could abandon a project where its finance is project related with little or no guarantees from the parent company, but could not do the same with a project that is company financed.

- Irrevocable assignment of approved payment certificates.
- Contractor's previous track record and performance in similar projects.
- Extend finance only to capable contractors.

8. Do you agree that contractors generally resort to Project Related Finance to increase their borrowing capability?

12 YES
8 NO

If NO what are other sources?

9. Do you monitor work's progress on the construction projects that you finance?

18 YES
2 NO

If yes, please state briefly if you use projected Cash Flow as a means of monitoring
10. Some lending banks require the borrower to assign irrevocably the project's monthly progress payments to them. Do you believe this practice affords enough security?

9 YES

11 NO

If no, what other forms of security do you require?

- Contractor's performance is the real security.
- Personal Guarantees and mortgage of fixed assets.

11. Do you fix a minimum/maximum contract price range in order to qualify for a Project Related Finance package?

6 YES

14 NO

If yes, please indicate price range

- Price is dependant upon market conditions.
- Minimum price $1.5 Million approx.

12. What is the contract duration that you would consider as most acceptable for Project Related Finance?

☐ Less than six months

☐ Six months

☐ Twelve months

☐ Eighteen months

☐ Two years

☐ More than two years

☐ Five years
13. Do you extend Project Related Finance to Contractors to acquire plant and high networth machinery?

YES

NO

If YES, please indicate to what extent you participate per project.

14. Do you investigate the methods the borrowers depreciate their plant and machinery?

YES

NO

15. Do you extend Project Related Finance to Contractors to include any or all of the following:

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over Draft facilities</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Letter of Credit</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Bid bonds</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Performance bonds</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Advance Payment Guarantees</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Maintenance Guarantees</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Professional indemnities</td>
<td>2</td>
<td>12</td>
</tr>
</tbody>
</table>
If YES, what are the securities you require before issuing such facilities

- Irrevocable assignment of project's receivables.
- Personal Guarantees.
- Mortgage of assets.

16. Do you set a turnover limitation to the amount of finance your bank is prepared to extend in Project Related Finance situations?

[ ] YES
[ ] NO
[ ] N/A

If YES, what is the maximum allowable percentage of a Contractor's turnover your bank is willing to finance?

- Depends on the strength of the company involved and varies from a minimum of 20% to a maximum of 80%.

17. What other limitations if any do you impose when considering Project Related Finance?

- Employer's financial position/reputation.
- Contractor's present work load and financial capacity.
- Contractor's management capability.
- Type and complexity of project.
- Central Bank regulations.

18. How much total exposure does your bank allow to one Project?

- Depends on borrower and project.
- Not fixed by project but rather by single obligor exposure
- Varies from a minimum of 10% to a maximum of 100%.

19. Do you consider contractors classification (Grading) an important factor in your decision making process to extend facilities?

[ ] YES
[ ] NO
20. How much importance do you place on foreign content risk concerning material and know how in a project?

<table>
<thead>
<tr>
<th>Importance</th>
<th>Very Important</th>
<th>Fairly Important</th>
<th>Possibly Important</th>
<th>Unimportant</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

21. The following are some sources of risk that have to be dealt with in construction projects. Please indicate how acceptable they are to your organisation:

Scale:

(1) Acceptable
(2) Fairly acceptable
(3) Negotiable
(4) Acceptable with conditions
(5) Unacceptable

<table>
<thead>
<tr>
<th>Source of Risk</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possible deficiency in working capital.</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Uncertainty about adequacy of reserves.</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Possible delay in commencement.</td>
<td>2</td>
<td>6</td>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Possible rise in costs.</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertainty about contractual matters.</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Variation in interest rate.</td>
<td>2</td>
<td>5</td>
<td>12</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Uncertainty about project completion.</td>
<td>5</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rise in rate of inflation.</td>
<td>1</td>
<td>8</td>
<td>6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Possible increase of debt to equity ratio.</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Possible cost overrun.</td>
<td>1</td>
<td>8</td>
<td>6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Possible lengthening in repayment period.</td>
<td>2</td>
<td>5</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possibility of Variation orders and consequent increase in contract duration and price.</td>
<td>8</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Currency Exchange variations.</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Effects of political changes.</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Force majeure events.</td>
<td>4</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>
CONTRACTORS
CONTRACTORS' ANSWERS TO
ASSUMPTIONS ON PROJECT RELATED FINANCE
(TOTAL NUMBER PARTICIPATED: 30)

Scale

(1) AGREE
(2) FAIR ASSUMPTION
(3) DISAGREE

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project Related Finance is a form of lending designed to help both the borrower and the lending bank make the most out of the investment by linking loan repayments to the construction project’s own cash flow.</td>
<td>21</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>2. Project Related Finance differs from Company and Corporate lending because the project loans are not completely secured by the value of the assets being financed. The lending bank must, therefore, consider progress on the project itself for returns and share major business risks.</td>
<td>21</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>3. Project Related Finance involves assigning the project’s earnings to the lending bank and may compel the bank to participate in controlling the project.</td>
<td>16</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>4. Project Related Finance is purely another form of bank loan designed to increase the borrowing capability of the construction contractor.</td>
<td>6</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Scale</td>
<td>AGREE</td>
<td>FAIR ASSUMPTION</td>
<td>DISAGREE</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>-------</td>
<td>-----------------</td>
<td>----------</td>
</tr>
<tr>
<td>5. Project Related Finance is the means to bring together a complete package of financial commitments from the lending bank and guarantees from the borrower to ensure successful completion of the construction project</td>
<td>14</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>6. Project Related Finance structure is more advantageous to the lender through its facility to control risks by separating the project’s revenue from revenue of other operations.</td>
<td>18</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>7. Project Related Finance allows the borrower not to guarantee all debts because the lending bank relies on the project’s performance for risks protection.</td>
<td>7</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>8. Project Related Finance means a higher debt-to-equity ratio resulting in a less risky investment for the borrower due to the absence of direct financial guarantees.</td>
<td>5</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>9. Project Related Finance is more attractive to lending banks than other financial methods because of the anticipated higher income through larger margins and management fees.</td>
<td>6</td>
<td>9</td>
<td>15</td>
</tr>
</tbody>
</table>
PART 2

SURVEY OF PROJECT RELATED FINANCE

1. Please indicate the type of your Business organisation:
   
   [3] Partnership
   [25] Private Limited Company
   [1] Public Limited Company
   [1] Other

2. Please give your turn over for the years 1990 - 1991 and 1991 - 1992

   1990 - 1991: Varied from a min of $8M to a max of $378.93M.
   1991 - 1992: Varied from a min of $11.0M by one construction company to a max of $474.34 M by another.

3. Do you use Project Related Finance facilities through a bank for the execution of your construction projects?

   [22] YES
   [8] NO

4. The following relate to types of credit facilities that may be made use of in construction. Please indicate the measure of importance your organisation places on each:

<table>
<thead>
<tr>
<th>Very Important</th>
<th>Important</th>
<th>Least Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company guaranteed loan</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Project Related Finance</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Mixed</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

   If you use other credit facilities, please state:

---

221
5. Do you use an in-house financial expert to study your financial needs and put together a financial package that is acceptable to the lending bank?

18 YES
12 NO

6. Please indicate in percentage terms the overall average financing structure of typical projects recently executed by your organisation during the last three years.

<table>
<thead>
<tr>
<th>% by banks</th>
<th>% own resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varied from 0% to 100%</td>
<td>Varied from 100% to 0%</td>
</tr>
<tr>
<td>with a mean average of 66.28%</td>
<td>with a mean average of 33.72%</td>
</tr>
</tbody>
</table>

7. If you use Project Related Finance through a lending bank, is the main reason behind your doing so to increase the borrowing capability of your organisation?

8 YES
22 NO

8. Please indicate your degree of preference for project Finance:

19 WHOLLY IN FAVOUR
21 WITH SOME RESERVATIONS
0 AGAINST
9. If you use Project Related Finance, does the package that you put to the lending bank for consideration normally include any of the following:

<table>
<thead>
<tr>
<th>Description</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Full feasibility study of project</td>
<td>10</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>- Report on your own technical capability</td>
<td>10</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>- Tender make-up of the project</td>
<td>20</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>- Projected cash flow of the construction project</td>
<td>25</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>- Company cash flow</td>
<td>11</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>- Balance sheet and capital structure of your company</td>
<td>20</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>- Ownership structure of your organisation</td>
<td>20</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>- Information about the project's owner</td>
<td>23</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

10. Do you believe that a construction project financed through a segregated Project Related Finance package is more likely to be abandoned if ran into difficulties than a similar project financed through conventional loans linked to the parent company?

<table>
<thead>
<tr>
<th>AGREE</th>
<th>DISAGREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>22</td>
</tr>
</tbody>
</table>

11. What securities do you give to secure the lending bank's approval to extend P.R.F. facilities?

- 33% Assignment of Project Progress Payments. (10 Nos)
- 27% Personal Guarantees. (8 Nos)
- 20% Corporate Guarantees. (6 Nos)
- 20% Fixed Deposit under lien. (6 Nos)

12. What is the maximum/minimum contract price that in your opinion warrants a P.R.F. package?

   Maximum: Unlimited.
   Minimum: $1 Million.
13. Do you consider the duration of the construction project as relevant when applying for P.R.F.?

[ ] YES

[ ] NO

If YES, please state the project duration in months/years that you consider to be most suitable for P.R.F. facilities


14. Do you believe that the contractor’s classification (Grading) has a bearing on the lending bank’s decision as to the level of their exposure towards them?

[ ] YES

[ ] NO


15. Do you use P.R.F. to finance plant and machines acquisition for the particular Project?

[ ] YES

[ ] NO

If YES, how do you depreciate the plant and machines in question knowing that they will carry on working for much longer than the project duration?


16. How much importance do you place on foreign content risk concerning material and know how in a project?

<table>
<thead>
<tr>
<th>VERY IMPORTANT</th>
<th>IMPORTANT</th>
<th>FAIRLY IMPORTANT</th>
<th>POSSIBLY IMPORTANT</th>
<th>UNIMPORTANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>15</td>
<td>6</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
17. [The following are some sources of risk that have to be dealt with in construction projects. Please indicate how acceptable they are to your organisation:]

**Scale:**

(1) Acceptable
(2) Fairly acceptable
(3) Negotiable
(4) Acceptable with conditions
(5) unacceptable

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possible deficiency in working capital.</td>
<td>5</td>
<td>10</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Uncertainty about adequacy of reserves.</td>
<td>8</td>
<td>7</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Possible delay in commencement.</td>
<td>7</td>
<td>8</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Possible rise in costs.</td>
<td>7</td>
<td>12</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Uncertainty about contractual matters.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Variation in interest rate.</td>
<td>8</td>
<td>12</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Uncertainty about project completion.</td>
<td>1</td>
<td>6</td>
<td>9</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Rise in rate of inflation.</td>
<td>11</td>
<td>10</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Possible increase of debt to equity ratio.</td>
<td>14</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Possible cost overrun.</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Possible lengthening in repayment period.</td>
<td>14</td>
<td>4</td>
<td>3</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Possibility of Variation orders and consequent increase in contract duration and price.</td>
<td>22</td>
<td>2</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currency Exchange variations.</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Effects of political changes.</td>
<td>14</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Force majeure events.</td>
<td>19</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
APPENDIX B

INTERVIEW GUIDE
INTERVIEW GUIDE

1. VERIFICATION OF THE STUDY'S HYPOTHESES:

Hypothesis Number 1

1.1 Why do you participate in Project Related Finance?
1.2 Do you believe contractors use Project Related Finance only for the purpose of increasing their borrowing power?

Hypothesis Number 2

1.3 Do you consider the assessment of risk exposure as the main criteria for Project Related Finance participation?

Hypothesis Number 3

1.4 Do you consider Project Related Finance less or more risky than corporate lending?
1.5 What major conditions do you consider as important in determining the credit rating of the project for Project Related Finance purposes?
1.6 Do you agree that by establishing the credit rating of a project risk exposure is minimized hence better finance facilities can be extended?

Hypothesis Number 4

1.7 Do you consider the ownership structure of the borrowing company as a necessary prerequisite for extending and receiving Project Related Finance?
1.8 Do you provide/carry-out an analysis of the accounts of the parent company?
1.9 Do you consider an analysis of the consolidated accounts as a decisive factor in
granting Project Related Finance?

**Hypothesis Number 5**

(Aimed at lenders only)

1.10 Do you investigate the financial standing of the project’s promoter in order to avoid non payment?

1.11 Do you investigate the borrower’s technical capability before granting facilities to ensure good performance?

**Hypothesis Number 6**

1.12 Should the borrower supply projected cash flow and the lender monitor the project’s progress payments to ensure that they are as per planned?

1.13 If progress payments do not match those planned, should the lender limit or reduce Project Related Finance facilities?

**Hypothesis Number 7**

(Aimed at lenders only)

1.14 Should the lending bank be satisfied with Project Progress Payments as security for Project Related Finance situations, or should it insist on other rights of recourse?
2. VERIFICATION OF THE ASSUMPTIONS ON Project Related Finance

2.1 Do you agree that P.R.F is a form of lending that links loan repayments to the construction project’s own cash flow?

2.2 Do you agree that Project Related Finance differs from Corporate lending in the sense that it is not secured by the value of the assets being financed?

2.3 Do you accept that Project Related Finance involves assigning the project’s progress payments to the lending bank and may compel the latter to participate in controlling the project?

2.4 Do you agree that Project Related Finance is purely a form of lending designed to increase the borrowing capability of the construction contractor?

2.5 Do you accept that Project Related Finance means a complete package of financial commitments from the lender and guarantees from the borrower to ensure successful completion of the construction project?

2.6 Do you agree that Project Related Finance is more advantageous to the lender as it separates the project’s revenue from revenue of other operations?

2.7 Do you accept that Project Related Finance allows the borrower not to guarantee all debts because the lender relies on the project’s performance for risk protection?

2.8 Do you agree that Project Related Finance allows the borrower a higher debt-to-equity ratio due to the absence of direct financial guarantees?

2.9 Do you accept that Project Related Finance is more attractive to lending banks than other loans because of its higher income through bigger margins and management fees?
3. VERIFICATION OF Project Related Finance QUESTIONS

3.1 LENDERS

3.1.1 Before extending finance facilities do you investigate any of the following:
   - Technical capability of the borrower?
   - Borrower's previous experience?
   - Adequacy of borrower's working capital?
   - Ownership of borrowing organisation?
   - Financial standing of the project owner?
   - Tender make-up of the project?
   - Projected cash flow of the project?
   - Cash flow of parent company?
   - Balance sheet and capital structure of borrowing organisation?

3.1.2 Do you monitor work's progress on the construction projects that you finance?

3.1.3 Do you believe the irrevocable assignment of the project's monthly progress payments to the lending bank affords enough security?

3.1.4 Do you fix a minimum/maximum contract price range in order to qualify for Project Related Finance?

3.1.5 What is the contract duration that you would consider most acceptable for Project Related Finance?

3.1.6 Do you extend Project Related Finance to contractors to acquire plant?

3.1.7 Do you extend Project Related Finance to contractors to include any or all of the following:
   - Over Draft facilities?
   - Letter of Credit?
   - Bid bonds?
   - Performance bonds?
   - Advance Payment Guarantees?
   - Maintenance Guarantees?
   - Professional indemnities?
If yes what are the securities you require before issuing such facilities?

3.1.8 What limitations do you set when considering Project Related Finance?

3.1.9 How much total exposure does your bank allow to one project?

3.1.10 Do you consider contractors' classification (Grading) an important factor in your decision making process for Project Related Finance?

3.1.11 Do you practice "name lending"?

3.2 BORROWERS

3.2.1 Do you use an in-house financial expert to study your financial needs and put together a financial package that is acceptable to the lending bank?

3.2.2 Is the main reason behind your using Project Related Finance to increase your borrowing capability?

3.2.3 To secure Project Related Finance facilities, do you have to supply the lending bank with any of the following:
- Report on your technical capability?
- Tender make-up of the project?
- Projected cash flow of the construction project?
- Company cash flow?
- Balance sheet and capital structure of your company?
- Ownership structure of your organisation?
- Information about the project's owner?

3.2.4 Do you believe that a Project Related Finance financed construction project is more likely to be abandoned if ran into difficulties than a similar one financed through conventional secured loans?

3.2.5 What securities do you give to secure the lending bank's approval to extend Project Related Finance facilities?

3.2.6 What is the maximum/minimum contract price that in your opinion warrants a Project Related Finance package?
3.2.7 What is the contract duration that you consider most acceptable for Project Related Finance?

3.2.8 Do you believe that contractors’ classification (Grading) influences the lending bank decision as to the level of their exposure towards them?

3.2.9 In the estimating and tendering process, do you practice front- or end-loading your tender?
APPENDIX C

STANDARD FORMS
Dear Sir,

SUBJECT: ISSUANCE OF BID BOND ON OUR A/C. NO.-______________

Please arrange for issuance of under noted amount of Bid Bond, enabling us to participate in the tender:

<table>
<thead>
<tr>
<th>Bid Bond Amount</th>
<th>Margins:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beneficiary Name</td>
<td></td>
</tr>
<tr>
<td>Bid Bond Submission Date</td>
<td>Validity Date:</td>
</tr>
<tr>
<td>Name of owner and/or</td>
<td></td>
</tr>
<tr>
<td>Financer of contract</td>
<td></td>
</tr>
<tr>
<td>Tender Title</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td></td>
</tr>
<tr>
<td>Scope of work</td>
<td></td>
</tr>
<tr>
<td>Estimated Tender Value</td>
<td>Contract Period:</td>
</tr>
<tr>
<td>Anticipated starting Date</td>
<td></td>
</tr>
<tr>
<td>Standard Payment Term</td>
<td></td>
</tr>
<tr>
<td>&amp; conditions under the contract</td>
<td></td>
</tr>
<tr>
<td>Special Terms (if any)</td>
<td></td>
</tr>
</tbody>
</table>

Similar projects completed in last 2 years and currently in hand:

<table>
<thead>
<tr>
<th>Value</th>
<th>Financed by</th>
<th>Owner Name</th>
<th>Consultant Name</th>
<th>Completion date/progress position</th>
</tr>
</thead>
</table>

Facilities to be required in case project is awarded us:

<table>
<thead>
<tr>
<th>Nature</th>
<th>Amount</th>
<th>Margin</th>
<th>Securities</th>
</tr>
</thead>
</table>

Name of other bidders for the above tender:

<table>
<thead>
<tr>
<th>Availability of equipment &amp; Technical staff for above job</th>
</tr>
</thead>
</table>

Other Information:

Authorised Signature: Customer:  
Account No.:  

Encl: COPIES OF LAST 2 TENDER RESULTS IN WHICH WE HAVE PARTICIPATED IS ATTACHED.
At the request of ____________________________ we hereby undertake to pay on first demand without conditions or proof to ____________________________ a sum of ____________________________ amount in words ____________________________ as Guarantee for the due and proper performance of the tender's liabilities.

This guarantee shall be valid upto _______ days from the latest date fixed for submitting the tender ______ and if the Tenderer, on whose behalf this guarantee is issued, is awarded the contract, its validity shall be automatically extended until such time as the performance bond required under the contract terms, is lodged.

This guarantee should be returned to the Bank upon its expiry date or upon fulfillment of our undertaking, whichever occur first.

Signatures
_________________________________________________.
LETTER OF GUARANTEE - PERFORMANCE BOND

REF:
DATE:

THE BENEFICIARY:
ADDRESS :

Dear Sir,

SUB: OUR PERFORMANCE BOND NO. FOR DH. CONSTRUCTION:

As Messrs. (hereinafter called "the Contractor") have described that their Tender for the construction of the above named works has been accepted, we hereby undertake to hold at your disposal the sum of Dhs. (U.A.E. Dirhams )% of the Contract Price, as a Performance Security. This Security shall be free of interest and payable in cash on your first demand in the manner ordered, without the Contractor or any person on his behalf or ourselves having the right to suspend or delay payment or to object thereto for any reason whatsoever.

This Security is valid until the Contractor has executed and completed the works and remedied any defects therein in accordance with the Contract and shall, before expiry, be automatically renewed until a Defects Liability Certificate has been issued or until advised by you that the contract has been fulfilled. No claim shall be made against the Security, on or after the issue of the Defects Liability Certificate when the Bank will admit no liability whatsoever after that date and request that this Performance Bond be returned.

Yours faithfully,

for Bank

Authorised Signatory

Authorised Signatory
LETTER OF GUARANTEE - ADVANCE PAYMENT

REF : 
DATE : 

THE BENEFICIARY :
ADDRESS :

Dear Sir,

SUB : OUR L.G. NO. ____________________________ FOR ____________________________
CONTRACT: ____________________________

On behalf of Messrs ____________________________

(hereinafter called "the Contractor")

In respect of Advance Payment towards ____________________________
we hereby guarantee the said contractor for the sum of ____________________________
towards ____________________________.

This Guarantee shall come into effect from the date of the Advance Payment of ____________________________ is made and realised to the credit of the contractor's account No. ____________________________ with us.

The amount shall automatically stand reduced to the extent of the advance amount less the approved running bills submitted by the contractor towards this Advance Payment.

This guarantee shall remain valid until ____________________________. Any claim made under this Guarantee should be received by the Bank in writing on or before that date. This Guarantee must be returned to the Bank upon its expiry date or upon fulfillment of our undertaking, whichever may occur first.

Yours faithfully,

for Bank

Authorised Signatory

Authorised Signatory
RETENTION GUARANTEE

THE BENEFICIARY
ADDRESS

REF NO: _______________
DATE: _______________

Dear Sirs,

SUBJECT : OUR GUARANTEE NO._____________________

At the request of Messrs ____________________________, we hereby undertake to pay to you or to your accredited representatives on first demand without any proof or condition the sum of Dhs. _______________ in respect of RETENTION GUARANTEE FOR MAINTENANCE OF _____________________________.

This Guarantee shall remain valid until (Date) ____________.

This guarantee shall come into effect from the date of Retention payment is made.

It is understood that any claim made under this guarantee should be received by this Bank in writing on or before (Date) ____________. The Bank will admit no liability whatsoever after (Date) _____________.

This guarantee should be returned to us upon the expiry date or upon fulfillment of our undertaking, whichever may occur first.

Yours faithfully,
for Bank.

AUTHORIZED SIGNATURE
# CASH FLOW FORMAT

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>COMMENCEMENT DATE</th>
<th>CONTRACT VALUE (Dh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OWNER / FINANCER</td>
<td>COMPLETION DATE</td>
<td>CONTRACT PERIOD</td>
</tr>
<tr>
<td>MAIN CONTRACTOR</td>
<td>MAINTENANCE PERIOD</td>
<td>CONSULTANT</td>
</tr>
</tbody>
</table>

| COST (Cash Out-Flow) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | TOTAL |
|----------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1. Mobilization      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| 2. Materials:        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| Local LC / TR / Acct. Settlement |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| Import LC / TR / Acct. Settlement |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| Cash Purchase / LPO. |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| SUB - TOTAL          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| 3. Sub-Contracts, LC Settlement |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| Cheques / PPCs Settlement |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| 4. Wages and Salaries |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| 5. Plant and Machinery |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| 6. Overheads         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| 7. Bank Charges      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |
| 8. Others            |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | TOTAL |

## CUMULATIVE CASH OUTFLOW

### INCOME

- Net PPC Realized @ 90%
- Net Money

### TOTAL CASH INFLOW

## CUMULATIVE CASH INFLOW

## NET SURPLUS / (DEFICIT)

## CUMULATIVE SURPLUS / (DEFICIT)

### DEFICIT COVERAGE: Own Source

- OD (PPC) @ 65%
- OD (Clear)

### TOTAL
APPENDIX D

STATISTICAL ANALYSIS
Refer to Chapter 8 Questionnaire Analysis

**Turnover - all data (Descriptive Statistics)**

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* Multiple modes exist. The smallest value is shown.

Valid cases 30  Missing cases 0

**Companies with turnover ≤ $40 million (Descriptive Statistics)**

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* Multiple modes exist. The smallest value is shown.

Valid cases 23  Missing cases 0

**CORRELATION COEFFICIENTS - PEARSON’S**

**ALL DATA**

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(Coefficient / (Cases) / 2-tailed Significance)

“.” is printed if a coefficient cannot be computed.

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(Coefficient / (Cases) / 2-tailed Significance)

“.” is printed if a coefficient cannot be computed.
### Banks Finance Percentage - all data (Descriptive Statistics)

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Mean 66.286
Std dev 30.307

Valid cases 28  Missing cases 2

### Banks Finance Percentage - Companies with turnover ≤ $40 million (Descriptive Statistics)

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Mean 67.545
Std dev 27.562

Valid cases 22  Missing cases 1

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242
### Self Finance Percentage - All data (Descriptive Statistics) (Inverse of Bank Finance)

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TOTAL: 30 100 100

Mean: 33.714  Median: 25.000  Mode: 30.000
Std dev: 30.307

Valid cases 28  Missing cases 2

### Self Finance Percentage - Companies with turnover ≤ $40 million (Descriptive Statistics)

<table>
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<th>Value Label</th>
<th>Value</th>
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TOTAL: 23 100.0 100.0

Mean: 32.455  Median: 25.000  Mode: 30.000
Std dev: 32.562

Valid cases 22  Missing cases 1
### T-tests for independent samples of group/Size of turnover

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<tr>
<th>Variable</th>
<th>Number of Cases</th>
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<th>SD</th>
<th>SE of Mean</th>
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Mean Difference = 5.8788

Levene's test for equality of variances:

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<th>T-Value</th>
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<th>2-Tail Sig</th>
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<th>CI for Diff</th>
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**T-test for equality of means**

95%

### Mann-Whitney U - Wilcoxon Rank Sum W Test

Banks Finance Percentage

By GROUP Size of turnover

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<th>U</th>
<th>W</th>
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The difference is insignificant.
Sampling Error Calculation for small turnover companies

Z = value related to confidence level to be 95% sure, Z = 1.96
n = sample size = 22 (due to one missing case, companies with < US$40 m.)
e = error
σ = standard deviation of sample = 67.5

\[ n = \frac{Z^2 \sigma^2}{e^2} \]
\[ e^2 = \frac{Z^2 \sigma^2}{n} = \frac{(1.96)^2 \times (27.56)^2}{22} = 132.63 \]
\[ e = 11.5\% \text{ (approx. 12\%)} \]

95% sure that results are within ± 12% of the mean (67.5% finance from banks)

(Ref: Tull, D. & Hawkins, D. 1993.)
ALL COMPANIES

NUMBER OF COMPANIES

BANKS FINANCE PERCENTAGE

Std. Dev = 30.31
Mean = 66.3
N = 28.00
COMPANIES EXCLUDING TURNOVER MORE THAN $40 MILLION

BANKS FINANCE PERCENTAGE

Std. Dev = 27.56
Mean = 67.5
N = 22.00
**HYPOTHESES STATISTICAL ANALYSIS** (see Chapter 8 Testing the hypotheses)

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Leads to formula: \( \chi^2 = \frac{N(ad-bc)^2}{(a+b)(a+c)(b+d)(c+d)} \)

Yates correction for small sample sizes gives: \( \chi^2_y = \frac{N((ad-bc) - N/2)^2}{(a+b)(a+c)(b+d)(c+d)} \)

1. **Hypothesis 1**

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<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

\( N=50, \ a=8, \ b=22, \ c=12, \ d=8 \)

Using the above formula \( \chi^2 = 5.555 \)

\( \chi^2_y = 4.25 \)

Degrees of freedom = \( (r-1)(c-1) = (2-1)(2-1) = 1 \)

\( r = \) no of rows, \( c = \) no of cols.

\( \chi^2_{\text{crit}} = 3.841 \) at 5% level of significance. Since \( \chi^2 \) and \( \chi^2_y \) are both greater than \( \chi^2_{\text{crit}} \) at the 5% level there is a significant difference of opinion between contractors and banks. However at the 2% level \( \chi^2_{\text{crit}} = 5.412 \) there is no significance.

2. **Hypothesis 2**

<table>
<thead>
<tr>
<th></th>
<th>Acceptable</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractors</td>
<td>470</td>
<td>190</td>
</tr>
<tr>
<td>Banks</td>
<td>145</td>
<td>325</td>
</tr>
<tr>
<td></td>
<td>615</td>
<td>515</td>
</tr>
</tbody>
</table>

\( N = 1130, \ a = 470, \ b = 190, \ c = 145, \ d = 325 \)

\( \chi^2 = 180.29 \)

\( \chi^2_y = 178.66 \)

Degrees of freedom as before = 1
\( \chi^2 \) crit = 3.841 at 5% level of significance
\( \chi^2 \) crit = 10.827 at 0.1% level of significance.

Since \( \chi^2 \) and \( \chi^2_y \) are very much greater, then there is an extremely significant difference in risk taking between bankers and contractors.

### 3. Hypothesis 3

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractors</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Banks</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>31</td>
</tr>
</tbody>
</table>

\( \chi^2 = 0.693 \)

\( \chi^2_y = 0.287 \)

\( \chi^2 \) crit = 3.841 at 5% level of significance.

Degrees of freedom = I as before. Therefore there is no significant difference at 5% level.

### 4. Hypothesis 4

<table>
<thead>
<tr>
<th></th>
<th>Acceptable</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractors</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Banks</td>
<td>19</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>39</td>
<td>11</td>
</tr>
</tbody>
</table>

Although cell (d) will have an expected frequency slightly below 5 the Fishers exact test will not be applied as the other frequencies are well above and Yates continuity correction will be applied.

\( \chi^2 = 5.61 \)

\( \chi^2_y = 4.08 \)

Degrees of freedom = 1

\( \chi^2 \) at 5% level of significance = 3.841.

Significant difference at 5% level

\( \chi^2 \) crit at 2% level of significance = 5.412

Therefore there is no significant difference at 2% level.

### 5. Hypothesis 5

Hypothesis 5 is directed only at banks. All 20 banks agreed upon the financial standing of the project owner and technical capability of the borrower (Questions 5 and 6.)
6. Hypothesis 6

<table>
<thead>
<tr>
<th></th>
<th>Accept</th>
<th>Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractors</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>Banks</td>
<td>18</td>
<td>2</td>
</tr>
</tbody>
</table>

Since 2 cells have expected values of 5 or below, then Fisher’s exact test must be used.

Here the formula is \( \frac{(a + b)! (a + c)! (b + d)! (c + d)!}{N! a! b! c! d!} = \frac{30! 43! 7! 20!}{50! 25! 5! 18! 2!} = 0.271 \)

This is the probability of obtaining the data we have is 0.27. Thus there is a 27% chance of obtaining the data when the null hypothesis : (no difference in opinion) is true. There is no significant difference of opinion between contractors and banks in relation to scrutinising the project’s cash flow.

7. Hypothesis 7

Hypothesis 7 is directed only at banks. Eleven did not accept progress payments as enough security confirming the banks’ right of recourse (Question 10). The banks’ right of recourse was accepted by seven and rejected by one in the interviews validating the hypothesis further.

The foregoing analysis, therefore, show that there is no significant difference of opinion between contractors and banks in the validation of hypotheses 2,4,5,6 and 7 and the rejection of hypotheses 1 and 3.