

**COMMON IRREGULARITIES/LAPSES OBSERVED
IN AWARD AND EXECUTION OF ELECTRICAL,
MECHANICAL AND OTHER ALLIED CONTRACTS
AND GUIDELINES FOR IMPROVEMENT THEREOF**

**CHIEF TECHNICAL EXAMINER'S
ORGANISATION**

**CENTRAL VIGILANCE COMMISSION
GOVERNMENT OF INDIA**

“If you think you are too small an entity to play any role in the fight against corruption, think of the potential of an atom”

**COMMON IRREGULARITIES/LAPSES OBSERVED
IN AWARD AND EXECUTION OF ELECTRICAL,
MECHANICAL AND OTHER ALLIED CONTRACTS
AND GUIDELINES FOR IMPROVEMENT THEREOF**

CHIEF TECHNICAL EXAMINER'S ORGANISATION

**CENTRAL VIGILANCE COMMISSION
GOVERNMENT OF INDIA**

"On this Earth, there is enough for everyone's need but not for their greed"

M.K. Gandhi

P. SHANKAR

Government of India
Central Vigilance Commissioner

Central Vigilance Commission
Satarkata Bhawan,
GPO Complex, Block 'A', INA,
New Delhi 110023

November 21, 2002

MESSAGE

This is another publication from the Chief Technical Examiner's Organisation of the Central Vigilance Commission which is very revealing and makes compulsive reading. Several pitfalls and lapses that are observed in awarding contracts and purchases are highlighted in this volume. It will be useful for every executive to go through this and avoid such mistakes. It is always wise to adhere to the various circulars and instructions before we make a decision. The time tested methods should never be given a go-by in the name of urgency.

Once again we commend the efforts put in by the Chief Technical Examiner in bringing out this volume.

Sd/-

(P. Shankar)

Central Vigilance Commissioner

Sd/-

(H.J. Dora)

Vigilance Commissioner

Sd/-

(Janki Ballabh)

Vigilance Commissioner

**“Parasite of corruption attacks
moral, social and economic fibre of
the nation”**

PREFACE

Corruption has become the bane of our society. It has assumed alarming proportions and encompasses all spheres of life. There was a time when socially, a corrupt person was not considered a desirable person. But today we have reached such a cynical stage that corruption is not only taken for granted but people with money, however ill gotten it may be are respected by the society. The spreading cult of consumerism and a desire for an ostentatious life style tempts many to make money by hook or crook. This not only results in vicious cycle of corruption but also increased criminalisation of the society. The recent exposes, disclosures and a spate of financial scams have very dramatically highlighted the extent of corruption in high places, in public life.

Corruption can be tackled only by sustained and coordinated effort. In the context of Government organisations and PSUs it is imperative and there is transparency and accountability in governance. The root cause of poor governance lies in corruption. The poor governance in turn, affects the productivity, efficiency, image and the profitability of the organisation. One area which not only affects the bottom line of the organisation considerably but is also corruption prone is the area of contract management. Any mismanagement in the award and execution of contracts may result in heavy leakages of revenue and adversely affect the image and profitability of the organisation.

The CTE organisation of the Central Vigilance Commission conducts intensive examination of all types of works and contracts, executed by various organisations under its purview. During the course of such examinations, a number of irregularities and lapses in the award and execution of the works are observed which are brought to the notice of CVO's for suitable corrective action. However, it has also been our endeavor to help improve the systems in the organisations so that a recurrence of such lapses/irregularities is prevented and there is better technical and financial control in the execution of works. Keeping this perspective in view, this booklet highlighting the lapses/irregularities in the award and execution of electrical, mechanical and other allied contracts is being issued. The lapses have been explained and discussed with illustrations as far as possible. The aim of the booklet is not to indulge in fault finding exercise but to help improve the systems and procedures in the organisations so that the project/contract management is more objective, transparent and professional.

Any omission and suggestions for improvement may please be brought to the notice of the undersigned.

Sd/-

(M.P. Juneja)

**Chief Technical Examiner
Central Vigilance Commission**

**New Delhi
November 2002**

**“A Vigilant nation
is a
progressive nation”**

CONTENTS

PART - I

COMMON IRREGULARITIES/LAPSES OBSERVED IN AWARD OF ELECTRICAL, MECHANICAL AND OTHER ALLIED CONTRACTS AND GUIDELINES FOR IMPROVEMENT THEREOF.

S.No.	Description	Page Nos.
1	Introduction	13
2	Scope	13
3	Works Manual	13
4	Necessity and Justification of Works	14
5	Appointment of Consultants	16
6	Estimates	18
7	Notice Inviting Tenders	19
8	Pre-Qualification Criteria	21
9	Tender/Bid Documents	23
10	Receipt of Tenders	25
11	Postponement of Tender Opening	25
12	Opening of Tenders	26
13	Techno - Commercial Evaluation of Tenders	27
14	Post Tender Negotiations	29
15	Reasonableness of Prices / Market Rates Justification	29
16	Award of Works and Signing of Contract Agreement	30
17	Advance Payment and Bank Guarantees	30
18	Performance Bank Guarantee and Insurance	31
19	Completion Schedule of Contracts	32
20	Defect Liability Period Clause	32
21	Payment Terms and Applicability of Taxes and Duties	33
22	Post Contract Management	34

PART - II

COMMON IRREGULARITIES OBSERVED IN FIELD/SITE INSPECTION OF VARIOUS WORKS :

S.No.	Description	Page Nos.
1	Electrification Works (External & Internal)	39
	1.1 H.T. Panels	39
	1.2 Transformers	39
	1.3 L.T. Panels & Cables	40
	1.4 Internal Electrification	42
2	Air-Conditioning Works	44
	2.1 Heat Load Calculations	44
	2.2 Chillers	44
	2.3 Compressors	44
	2.4 Condensers	45
	2.5 Condenser and Chilled Water Motor Pumps	46
	2.6 Air Handling Units	46
	2.7 Ducts, Grills and Diffusers	48
	2.8 Cooling Towers	48
	2.9 Pipes and Fittings	49
	2.10 General Workmanship	49
3	Lifts / Elevators	51
	3.1 Machine Room	51
	3.2 Lift Car	52
	3.3 Shaft	53
	3.4 Testing of the Lifts	54
4	Fire Detection And Fire Fighting System	55
	4.1 Control Panels, Control Cables, Detectors & Hooters	55
	4.2 Main and Jockey Pumps	546
	4.3 Pipes and Fittings	57

PART - I

**COMMON IRREGULARITIES/LAPSES OBSERVED
IN AWARD OF ELECTRICAL, MECHANICAL AND
OTHER ALLIED CONTRACTS AND GUIDELINES
FOR IMPROVEMENT THEREOF**

**“Moral contempt is a far greater
indignity and insult than any kind
of crime”**

1. INTRODUCTION

1.1 The Chief Technical Examiner's Organisation (CTEO) in the Central Vigilance Commission is the technical wing of the Commission and it advises the latter on all technical /contract matters. One of the important functions of the CTEO is to conduct an independent technical examination of various works, reported by the CVO's in their quarterly progress reports. The preponderant objective in such examinations is to detect malpractices in the award and execution of works as also to contain the recklessness and financial imprudence which may result in losses to the organisation. However, the role is not limited to detection of malpractices and punishment of errant practices. It has also been our endeavour to help improve the systems in these organisations so that a recurrence of lapses/irregularities is prevented in the contracts and there is better technical and financial control that result in efficiency and transparency outcomes. Keeping this perspective in view, two booklets - one on Procurement Systems and other on Civil Construction Works were issued by the Commission. In continuance of this effort while also taking into account the persistent demand from officials of various organisations, this booklet on lapses/irregularities often observed in the award and execution of electrical, mechanical and allied works has been compiled, with guidelines for improvement.

2. SCOPE

2.1 The award and execution of contracts is a very vast area and it is not possible to discuss the whole gamut of issues involved with this activity in a small booklet. However, an effort has been made to highlight some of the important areas, which are more prone to recurrence of lapses/irregularities, in a large number of organisations. The booklet has been divided into two parts - Part I deals with award of Contracts and Part II with the execution of Contracts. The main emphasis is on objectivity and transparency in award and execution of contracts. A dire need is also felt to inculcate a culture and spirit of professionalism amongst officials managing the contracts so as to ensure high standards of quality and timely completion of works.

3. WORKS MANUAL

3.1 Ideally, the objective of any public contracting is to get the proposed work executed as per bid specifications within a given time schedule and at the most competitive prices. To achieve this objective, it is essential to have well-documented and customised policy guidelines in each organisation so that this vital activity is executed in a well-coordinated manner with least time and cost overruns. It is felt that the absence of a proper Works Manual in most organisations

constitutes a significant weakness in the system as it not only leads to adhocism and arbitrariness in decision making but also results in a lack of quality supervision in the execution of works as benchmark standards are not available. This also encourages the 'interested officials' to indulge in corrupt practices, due to lack of accountability in the system. Surprisingly, some fairly well established organisations have no Works Manual despite awarding contracts for many years. Works executed here may be based on the whims of individuals or the responsibility may even be completely abdicated to the consultants. In other organisations, where the manual is available, it is found that the same has not been updated for years. Such a situation is far from satisfactory and needs to be corrected on an urgent basis.

- A codified 'Works Manual' containing the detailed tender/contract procedures, guidelines and standards for execution along with proper delegation of powers needs to be prepared by all the organisations so that there is a systematic and uniform approach in the organisation. Such an integrated approach is not only likely to put a cap on corruption but would also ensure smoother and faster decision-making. The organisations not having their own manuals may till such time, that a comprehensive Works Manual may be put together could consider adopting the Works Manual of established engineering organisations like the CPWD, Railways, MES, etc.

4. NECESSITY AND JUSTIFICATION OF WORK

4.1 In the course of inspections by the CTEO, it has been noticed that at times, proposals are initiated and works executed by the organisations without establishing the need or justification for such works. In some organisations there is a frenzy of activity at the end of the financial year in order to indiscriminately part funds (lest they should lapse), in either frivolous activities or in 2nd and 3rd stage priority proposals. In worst cases, the proposals are initiated in collusion with contractors to buy and install equipments nearing obsolescence resulting in completely infructuous expenditure. The following cases are illustrative :

- i) A port trust initiated a proposal for supply and installation of 2 nos. of 1000 KVA DG sets, without preparing proper justification. The port was declared an essential service by the SEB and was accorded a preferred customer status. There were hardly any power cuts in the preceding 2/3 years. The existing two DC sets of the same rating had sparingly been used as per logbook records and 30% of the port's activity was to be diverted to another port. The wastage was further compounded by installing DG sets of obsolete technology (with 2-stroke engines) rendering the whole expenditure infructuous.

- ii) A PSU company installed a large capacity effluent treatment plant to supplement the existing one. However, a study of the past statistics and the projected future profile of effluent generation established that the effluent generation growth was in fact negative and the existing plant was adequate and a new plant was not justified.
- iii) Another case of wasteful expenditure was regarding supply and installation of 8 nos. of 10 tonne Electric Wharf Cranes, as a replacement for the existing 3 tonne and 6 tonne cranes. However, the utilisation of new cranes was found to be pathetically low (3.3%) and was attributed to the sluggish and interrupted operation of these cranes as also the non-availability of bigger cargo. In fact, the cargo units predominantly handled here fell in the under 3 tonne category.
- iv) While constructing a residential colony, with a calculated load of 1 KW individual cables of 2 x 16 sq.mm. were provided by a PSU from the feeder pillar for each flat. These should have been laid from the main Distribution Board from the feeder with a suitable size cable, which would have resulted in substantial savings. Further, the transformers installed were of a total capacity of 3200 KVA (4 x 800 KVA) against a load of 1200 KVA thus increasing the cost of the project by over-designing the whole system. The expenditure on the consultancy charges also increased proportionately.
- v) In yet another case the Electricity Board made a provision of 2 x 20 MVA transformers, against the envisaged total load of 7.5 MVA, for the new campus of a renowned university, ostensibly to cater to the long-term futuristic demands.

- Before according administrative approval for any project, it is necessary to establish its techno-commercial viability in terms of rate of return and other benefits and also to evaluate the available alternatives to ensure an optimum utilisation of public funds. The tendency to park the funds in frivolous projects to beat the '31st March Blues' needs to be severely discouraged.

- One time purchase of capital plant and machinery should be justified by reference to the actual intended use. The equipments must conform to the latest specifications and technology available in the market. The obsolescence factor, the life of the equipment, availability of spares, etc. should be kept in view while deciding the procurements.

- Gross over-designing cannot be justified on the basis of unpredictable long-term futuristic demands. This kind of over-designing, particularly in sub-stations, DG sets, etc. not only results in unjustified one time extra expenditure but also results in avoidable recurring expenditure in terms of maintenance costs and higher standing losses. Since over-designing of electrical equipments has rather become a norm, it needs to be given a fresh look as far as optimal designing is concerned.

5. APPOINTMENT OF CONSULTANTS

5.1 Some organisations appoint consultants due to lack of in-house expertise in technical matters. While hiring consultants is justified for such organisations, of late, it has been observed that even the engineering departments and some PSUs, with large technical set-up have indulged in the practice of hiring consultants. It has invariably been noticed that the appointment of consultants is done in an ad hoc and non-transparent manner without inviting tenders and without collecting adequate data about their performance, capability and experience. In some cases the consultants were appointed after holding direct discussions with only one firm without clearly establishing the job-content and consultation fee payable to them. Often the scope of work entrusted to the consultant is either not defined properly or the consultant is given a free hand to handle the case so that experiments with impractical, fanciful and exotic ideas result in unwarranted costs. The organisations display an over-dependence on consultants and invariably abdicate their responsibility completely. The officials do not even oversee the working of the consultants resulting in the latter exploiting the circumstances and at time, in collusion with the contractors, give biased recommendations in favour of a particular firm. It has also been noticed that the consultants recommend acceptance of inferior items/equipments and also give undue benefit to the contractors like non-recovery of penalties for the delayed completion. Following illustrations are relevant to highlight shortcomings in appointment and functioning of consultants.

- i) In one such case the project was for design and construction of a training institute on a big plot of land in very posh and expensive area. The whole construction was two storeyed with no scope for future expansion. Ironically all other buildings in the vicinity are multi-storeyed highlighting the fact that space utilisation here was very poor. Further, the walls in the reception area and on the outside of the auditorium were provided with acoustic insulation with no rationale. For air-conditioning of the library, instead of providing a single AHU of suitable capacity with ducting, etc., 20 plus AHUs had been provided in the room. Such fanciful ideas along with the poor planning and supervision, resulted in the project suffering heavy cost and time overruns. In one of the works for a bank in Mumbai, the substation equipment has been installed in the basement area, jeopardizing the safety aspect, as Mumbai gets its fair share of heavy rains and the area is also in close proximity to the sea.
- ii) In another case, the organisation invited and short-listed 5 consultants but awarded the contract to the highest bidder on the plea that the bidder had done a very good job in some other project with the organisation. Extra amount on account of travel expenses, boarding and lodging was also sanctioned, beyond contractual terms.

- iii) In yet another case the organisation for construction of its Head Office, invited bids to appoint a consultant for the project. In the pre-qualification clause one unique condition was incorporated which stated that the firm should preferably have a branch office in the city where the project was proposed to be implemented. However, this was not a mandatory condition. After receiving the offers, the firm, who was subsequently appointed, was rated better than the other (lower offers) on the grounds that the firm had a branch office in the city where Head Office was proposed to be constructed.
- iv) A bank, for construction of its Head Office in Mumbai, short-listed three firms after a thorough scrutiny of offers submitted by a large number of bidders. The price bid part of only three firms were opened, after bringing them at part techno-commercially. But in a surprising manner, the work of consultancy was awarded to an L-2 firm thus compromising all ethics of the tendering.
- v) The payment terms to the consultants are often allowed quite liberally. In one of the cases, the consultant's fee was paid on quarterly basis without linking the same with the progress of the project. Full payments had been authorized even before the completion of the project. In yet another case, the constant was allowed extra payment on the plea that since the case was re-tendered, the consultant had to generate extra documents and hence extra payment was made to them. However, the reasons for re-tendering were found attributable to the consultants but instead of penalising, consultants were rewarded with extra payment.
- vi) Some organisations, have of late been indulging in a new practice of appointing multiple consultants. First the main architects/consultants, for initiating and implementing the project, are appointed. Then one more consultant named as Project Management Consultant (popularly known as PMC) is appointed ostensibly to monitor the execution of works. In some cases one more body having hired professionals and designated as Appex Management Consultant (AMC) is constituted to monitor the progress of the PMC. By appointing so many agencies, the responsibility of the officials of the organisation and these outside agencies gets diluted while the role of these officials is reduced to the signing of cheques alone. All such projects with multy-agency involvement invariably suffer from heavy time and cost overruns. Since the self-interest of outside agencies takes precedence over the loyalty towards the organisation, these agencies tend to collude or collide with each other, and both the situations are detrimental to the smooth implementation of the project.

- The appointment of consultants should be absolutely need based and for specialised jobs only. The selection of consultants should be made in a transparent manner through competitive bidding. The scope of work and role of consultants should be clearly defined and the contract should incorporate clauses having adequate provisions for penalising the consultants in case of defaults by them at any stage of the project including delays attributable to the consultants. As far as possible a Project Implementation Schedule indicating maximum permissible time for each activity should be prepared with a view to arrest time over-runs of the projects. The role of the consultants should be advisory and recommendatory and final authority and responsibility should be with the departmental officers only.

6. ESTIMATES

6.1 In some cases, it has been observed that the estimated value put to tender is at large variance with the actually accepted value of the contract. The reasons for this can be attributed to either wrong assessment of quantities of items or the sketchy estimates prepared in an unprofessional manner. Sometimes to arrive at the estimated value for a particular item, the rates of lower capacity items are extrapolated or a linear escalation is added to the last accepted rates for similar items. The estimates thus prepared are found to be far from realistic. This results in award of contracts at very high rates vis-à-vis the estimates. In one hydroelectric project, against an estimated cost of about Rs.300 crores, the contract was awarded at Rs.600 crores. To justify the rates various factors which were not tenable at all were considered and the estimated cost escalated so as to bring it as close to the quoted rates as possible. The award, despite a padding of the estimate was still at 31% above the justified amount. In some of the big value turnkey projects, it was noticed that the techno-commercial feasibility reports are prepared by some external agencies and the project award and implementation is done by different departments - at time with a considerable time gap. In one such case, in the award of a contract for an effluent treatment plant; the implementing agency, initially considered the estimated cost in the feasibility report as correct and the bids were also invited based on those estimates. However, the work was subsequently awarded at a rate almost 100% more than the estimated cost and the vast difference was justified on the plea that the estimate was deficient and unrealistic.

- Preparation of estimates for contracts is an area, which needs special emphasis. A well-defined scope of work and a realistic market rate estimate can prove to be a vital input for successful execution of a contract with high standards of quality. The estimates should take into consideration all relevant factors based on the prevailing market price of various inputs such as labour, material, equipment, etc. at the concerned locations. The estimates inter-alia should include the basic price, fabrication charges, inspection fees, duties, packing, handling and

transportation charges, sales tax on works (WCT), octroi or any other statutory levies and installation, erection, testing and commissioning charges, licence fees, contingencies, etc. as applicable at the time of conception of the project. For big projects like Hydro-electric projects and other turnkey contracts where financial assessment of the project is done well in advance, before the finalisation of the contracts, the financial amount indicated in Techno-Economic clearance/Techno-Commercial feasibility reports should be duly analysed and updated before converting the same into a workable estimate. Any deficiency or inadequacy of data (in terms of rates or quantity) found in such reports should be highlighted beforehand in order to prepare a realistic estimates for the tenders.

7. NOTICE INVITING TENDER

7.1 The most preferred, competitive and transparent mode of tendering is to go in for Open/Advertised tenders. However, there is a tendency in some organisations to go in for limited tenders for high value works. The reasons given for this are, either that the work has to be completed in a very short time or that the firms known for carrying out a particular work are very few in number. In the process, the competition is restricted which in turn results in cartel formation, higher rates and favouritism to select firms. At times, even in cases where advertised/global tender notices are issued, the same are published in 'local' dailies and not in any national newspaper. Surprisingly, in some cases, the notice was published only in the 'evening' newspapers. There are cases of the tender notice being published in a leading national newspaper but not on the page dedicated to the advertisements for tenders, thus partly restricting the competition and defeating the purpose of issuing advertised tenders. Some PSUs routinely follow the limited tendering system for all works and issue tender documents to contractors on their approved list. In one oil PSU, limited tenders were issued to 6/7 approved contractors but only one offer was received. Though this was almost 20% higher than the estimated rate, it was accepted and the contract awarded, without any negotiations. On further examination, it was found that the other 'approved contractors' had not even bothered to respond or to send a regret letter which established that they were either no longer interested in dealing with the organisation or had formed a cartel to divide different works of the said organisation among themselves. Ironically, the 'approved contractors' list had been formed a long time back and had not been updated for years - giving credence to the cartel theory.

- In order to generate wide publicity for better competition and to avoid cartel formation and favouritism to select firms, it is imperative that the advertised/global tender notice should be published in select 'national' and 'local' dailies with a large circulation. Tender notices may also be displayed on the notice boards of other organisations. In case of global tenders, copies of the tender notices should be sent to the Indian Missions/Embassies in major trading countries. In addition to the

paper advertisements, the tender notices should also be put on the website indicating all the details of the tender. In case of limited tenders to 'approved contractors', due care should be taken to generate adequate competition and reasonableness of rates should be established. The 'approved' list should be periodically updated weeding out the non performers and including fresh entrants in the field.

7.2 The Notice Inviting Tenders (NIT) should contain all the relevant information in an explicit and categorical manner. Some organisations do not indicate the estimated value in the tender notice with the apprehension that the bidder will come to know their estimates and who may then give biased offers. Some other organisations put forth a fraction of estimates in the tenders. And at times such information as may not be relevant and rather may mislead the bidders is also indicated in the tender notice. In one case of supply and installation of a DG set by a hospital in Delhi, the tender notice indicated an initial security deposit of Rs.1,00,000/-. This amount was to be deposited by the successful bidder after award of the contract but the bidders after seeing high value as initial security deposit probably mistook this amount to be deposited with tenders in addition to the EMD. As a result some firms refrained from buying the bid documents and only one tender was sold despite repeated extensions and eventually the work was awarded on single offer basis. It has also been noticed that the tender sale and tender opening dates are not indicated in the tender notices and the tender sale is closed much in advance of tender opening date.

7.3 In some cases, the time given for submitting the bids is unrealistically short and only such firms as are acquainted with the functioning of the organisation and with prior preparations are able to participate in the bid. One such case regarding execution of a very large hydroelectric project on turnkey basis is illustrative. The large and complex, work running into thousands of crores involved a lot of spadework before submitting the bids. But the time given for submitting the bids for such a large project was only 45 days. During the pre-bid conference and through correspondence almost all the firms requested for an extension of the bid submitting date which was not granted to them. Due to abnormally short time given, only two contractors submitted the bids in time. On examination of the case, it was found that these two contractors had participated in the first round of tendering for this work but the tender had to be cancelled due to non-conclusion of the financial tie-up for the project. The re-bids for the same work were invited almost after four years and on the plea of urgency sufficient time was not granted to the bidders to quote. However, these two contractors were fully prepared as they had already done their spadework and were therefore in a position to submit their bids in such a short period. The contract was also awarded at very high rates. Thus, the purpose of floating global tenders to give wide publicity and generate sufficient competition seems to have been defeated.

- In order to generate fair and adequate competition, it is important that sufficient time, depending upon the magnitude and complexity of the project should be given to the bidders to submit their bids. For big projects, extensions if asked by a majority of the bidders may be considered in the larger interest of the project. Any corrigenda issued in support of extension of dates or any other information should be individually intimated by various means and also be published in the media for wider publicity.

8. PRE-QUALIFICATION CRITERIA (PQ)

8.1 The pre-qualification criterion is a yardstick to allow or disallow the firms to participate in the bids. A vaguely defined PQ criteria results in stalling the process of finalising the contract or award of the contract in a non-transparent manner. It has been noticed that organisations, at times pick-up the PQ criteria from some similar work executed in the past, without appropriately amending the different parameters according to the requirements of the present work. One such case of defective PQ criteria which resulted in restriction of competition and apparent favouritism to a particular firm, pertained to design, manufacture and installation of a cooling tower in one of the thermal power units of a PSU. The PQ criteria kept in the bid documents envisaged a condition of minimum capacity (in M³/Hr) of cooling tower to have been executed in past by the prospective bidders. The minimum capacity was taken from the PQ conditions of a similar work but of higher capacity, executed in the past. On examining the case, it was found that this particular threshold value resulted in qualifying only one bidder while a reputed PSU company that was L-1 got disqualified by a very narrow margin. Thus, the work was awarded to L-2 firm with a huge difference of amount between L-1 and L-2. Had the threshold value kept in the PQ criteria been amended in proportion to the reduction in capacity of cooling towers, probably L-1 firm would have qualified. Therefore, keeping a threshold value in manner, which disqualifies the reputed and big firms out of the very few bidding firms not only results in restriction of competition but smacks of non-transparency and favouritism.

8.2 At times the cases are re-tendered without adequate justification. While re-tendering, the PQ criteria is revised with a view to facilitate the entry of a particular firm. In one such case for the supply and installation of an AC plant in a PSU's corporate office building, the tenders were originally called with the condition that prospective bidders with an experience of installing 1000 tonne capacity only were eligible. The case was re-tendered without convincing justification and the experience criterion was reduced from 1000 tonne capacity to 600 tonne capacity. The firm awarded the work finally, had not qualified in the first round of tendering.

8.3 Another important criterion for pre-qualification of bidders is the period for which the work experience is to be considered. The cut off dates regarding work experience are not clearly indicated. In one such case, regarding the hiring of DG sets by a PSU, on an annual basis, the PQ criteria required the prospective bidders to have three years experience in supplying DG sets to any Government/PSU company on a hire basis. Thus, the firms that had conducted such a business for 3 years, even 20 years back were qualified. On account of this vague condition, some firms that were currently not even in this business also participated in the tender.

8.4 The most important aspect of the PQ criteria is of course the nature of work for which the experience is required. Invariably the phrase ‘similar work’ is used in the tender notice and bid documents. This ‘similar work’ is interpreted differently by different agencies. In one case surprisingly, the supply and installation of AC ducting and the work of installing a false ceiling in the corporate office building of a PSU were combined in one tender. Such works are normally not executed together as ducting is normally executed as a part of the AC works while false ceiling forms part of civil construction or interior design works. Therefore, strictly speaking no firms can possibly qualify for such works with experience of ‘similar work’. On examination, all the firms who participated in the bid were AC contractors and none of them had any experience of false ceiling work which constituted a large portion of the total work.

- While framing the pre-qualification conditions, the end purpose of doing so should be kept in view. The purpose of any selection procedure is to attract the participation of reputed and capable firms with proven track-records. The PQ conditions should be exhaustive, yet specific. For bigger and new projects, as far as possible a preliminary survey may be conducted to collect relevant data from the market about the firms of repute in the field. The factors that may be kept in view while framing the PQ criteria are namely,

- (a) the nature of the work;
- (b) the scope of work involved in the project;
- (c) likelihood of availability/experience of firms for such works;
- (d) volume/amount of the work;
- (e) financial status.

In addition to above, the cut off dates for the period of work experience, the volume in terms of minimum capacity of equipments as well as in terms of monetary amount should be clearly indicated in the pre-qualification criteria so as to avoid any ambiguity at the time of evaluating the bids.

9. TENDER / BID DOCUMENTS

9.1 It has been noticed that tender documents containing instructions to bidders, or the general and the special conditions of contract are not updated to suit the contract requirement. As a result of obsolete, irrelevant and sometimes conflicting, vague and incomplete clauses are incorporated in the bid documents. Sometimes the ambiguities in the contract clauses are detected at the time of execution of works and due to wrong interpretations/disputes, contracts get delayed.

9.2 All the important clauses pertaining to earnest money deposit, completion schedule, factory testing of equipments, performance bank guarantee, payment terms, penalty for delayed completion, comprehensive insurance cover, contractors liability, safety arrangements, statutory arrangements for labour welfare, arbitration, etc. are at times not properly incorporated in the bid documents resulting in disputes and loss to the organisation. These clauses are important for safeguarding the interest of the organisation and also have an indirect financial bearing on the evaluation of offers and execution of the contracts.

- All the important clauses as brought out above need to be incorporated in the bid documents, in a proper and explicit manner so as to fully safeguard the interest of the organisation. The bidders are required to be made aware of what is expected to be done by them after award of the contract so that all factors may be considered by them while submitting the bids.

9.3 The amount of EMD asked for in some cases was found to be extremely low in comparison to the estimated amount of the work. At times, the limit of EMD had not been revised for 20 years. In such cases, the organisation's interest is not adequately safeguarded, in case the bidder rescinds the offer. Some organisations entertain bids that are not accompanied with earnest money and at times, the firms are asked to submit EMD after the tender opening. This violates the sanctity of tenders.

9.4 At times, the amount and form in which the EMD is required to be submitted are not mentioned properly or the same is accepted violating the stipulations of bid conditions. In one case, the bid documents did not specify any mode in which the EMD was to be submitted but at the time of opening of tenders, some of the offers were rejected on the plea that the EMD was not submitted in the form of a demand draft which of course was not specifically mentioned in the bid documents. In some other cases where tenders were invited in the two bid system, the EMD was stipulated as percentage of tender cost instead of fixed amount. In the two bid system, if the EMD is taken on the basis of some stated percentage of tender value and with the announcement of the amount of EMD submitted by the bidders at the time of tender opening, the same will give every bidder a good indication of the prices quoted by the competitors by calculating backwards. A bidder can use this

information to the disadvantage of this competitor, if prices are subsequently modified.

- The primary objective of submission of EMD is to establish the earnestness of the bidder so that he does not withdraw, impair or modify the offer within the validity of the bid. It also helps in restricting, if not eliminating 'speculative', frivolous' or 'wait and see' bids. Since any relaxation regarding submission of EMD has financial implications; the terms and conditions should clearly stipulated that the offers without EMD would be considered as unresponsive and rejected.

- The amount of earnest money deposit particularly in the two bid system needs to be indicated as a fixed and reasonable amount on the basis of an estimated value of the proposed work. Also the form in which EMD is acceptable should be clearly mentioned in the tender documents.

9.5 The evaluation/loading criteria on account of acceptable range of deviations in the commercial terms and conditions viz. payment terms, request for advance, security deposit, completion schedule, performance bank guarantee, etc. are either not incorporated in the bidding documents or even if mentioned, these are not considered, while evaluating the bids and the offers are evaluated simply on the basis of quoted prices which is not in order. In some cases relating to works involving equipments having minimum guarantee loss, provisions are not made for proportionate loading on account of deviation in minimum guarantee loss. The equipments such as AC plants, transformers, cooling towers, generating stations, etc. come under this category. The comparative assessment of offers in a true sense would be complete only if it is made while taking into account the deviations in terms and conditions, minimum guarantee loss, etc. with unequivocal evaluation criteria specified in the bidding documents, so that the evaluation of bids after tender opening could be made in a transparent manner without any subjectivity.

9.6 In some cases, only the nomenclature and capacity along with some broad technical details of equipments are incorporated in the bid documents and the generic specifications with complete details of performance parameters and the technical evaluation criteria are not mentioned. In the absence of detailed specifications/technical evaluation criteria, the evaluation of offers on an equitable basis and in a transparent manner would not be possible and would be prone to subjectivity. One such case of misinterpretation of specification because of vaguely defined bid conditions relates to the manufacture, supply and transportation of elbow liners required in a hydro-electric project. The elbow liners were to be supplied by properly welding all the segments before transportation to the site. But in the specifications, one clause that was vaguely incorporated stipulated that the segments to be dispatched for easy transportability. After dispatching the segments, the contractor claimed the full payment of elbow liners leaving the major portion of welding of segments as part of erection which had to be done departmentally. In another case, the list of preferred 'makes' of major equipments was neither included

in the bid documents nor was asked from bidders. The specifications included only the names and capacity of equipments and the details of materials, dimensions while other parameters of the equipments were not mentioned, thereby leaving everything to the whims of the contractor/supplier.

- The detailed generic technical specifications along with a list of preferred makes of major equipments, should be incorporated in the bid documents. In addition the performance parameters and the technical evaluation criteria, if any, need to be specified in the bidding documents in unequivocal terms. However, despite all precautions there may be some contradicting and conflicting specifications/conditions. In order to overcome such crisis, an order of precedence i.e. which part of contract will prevail over the others should also be mentioned in tender documents.

10. RECEIPT OF TENDERS

10.1 The receipt of tenders in some organisations is done in an organised and ad hoc manner. Sometimes the bidders representative leave the tenders with the concerned staff or send these through post addressed to some officer without having proper superscription over the envelopes resulting in the accidental opening of such tenders. This practice is highly objectionable and has to be severely discouraged, as it may cause tampering of offers and leakage of sensitive information.

- A suitable arrangement for receipt of tenders at the scheduled date and time through conspicuously located tender boxes needs to be adopted. The tender notice should categorically contain the information regarding receipt of bids, viz. designation and address of officer to whom the tender should be addressed, the superscription/reference number to be indicated on the envelopes and most importantly, the due date of opening of tenders to be written on the envelope containing tenders.

11. POSTPONEMENT OF TENDER OPENING

11.1 It has been noticed that whenever extension in tender opening is given due to any reason (like change in scope of work or changes in specifications of some of the equipments, etc.), the intimation regarding the extension is sent only to such bidders who had purchased tender documents originally even if the extension is regarding opening of first bid like pre-qualification in case of single bid system and techno-commercial bids in case of two bid system. By doing so, the competition is restricted to the firms who had purchased tender documents within the original date of tender sale. The corrigendum for such extensions is not being published in

newspapers. In some cases, the time given to submit the revised bids is quite insufficient.

- In order to give an equal opportunity to all the bidders and to maintain the sanctity of tendering system, it is of paramount importance that any change in the tender terms and conditions, specifications and tender opening date, etc. be notified to all the bidders sufficiently in advance of the revised tender opening date. In case of the advertised tenders, such notifications should invariably be through the publication of corrigenda in the media and also through individual information of those firms who had purchased the tender documents within the original tender sale date. However, in case the extension is regarding submission of first bid like pre-qualification documents in case of single bid system and techno-commercial bid in case of two-bid system, the tender sale date should also be extended suitably so as to allow new participants in the bid, in order to increase the competition.

12. OPENING OF TENDERS

12.1 In some organisations, the tenders are not opened in the presence of the bidders' representatives on the plea of maintaining absolute secrecy. Such a practice of not opening tenders in public and of not disclosing the rates quoted by all bidders to other firms is against the sanctity of the tendering system, and is a non-transparent method of handling tenders. The possibility of tampering and interpolation of offers, after opening of tenders, in such cases cannot be ruled out. Some organisations do not even maintain tender opening registers. The rates at times are not quoted both in figures and words, cuttings/overwritings are not attested by bidders.

- The opening of tenders in presence of the bidders' representatives needs to be scrupulously followed. While opening the tenders it needs to be ensured that each page of tender, particularly the price and important terms and conditions should be encircled and initialled with the date. Any cutting/overwriting should be encircled and initialled in red ink by the tender opening officer/committee. The tender opening officer/committee should also prepare an 'on the spot statement' giving details of the quotations received and other particulars like the prices, taxes/duties, EMD, any rebates etc. as read out during the opening of tenders. A proper tender opening register in a printed format should be maintained containing information viz. date of opening including extensions, if any, names and signatures of all the persons present to witness the tender opening which should include the bidders representatives also.

12.2 In cases involving the two bid system, it has been noticed that after opening of the technical bids, the price bids, which are to be opened subsequently, are kept as loose envelopes. In such cases, the possibility of tampering of bids prior to tender opening cannot be ruled out.

- In order to make the system fool-proof, it needs to be ensured that the tender opening officer/committee should sign on the envelopes containing the price bids and the due date of opening of price bids should be clearly mentioned on the envelopes and should again be placed in the tender box.

13. TECHNO-COMMERCIAL EVALUATION OF TENDERS

13.1 OPEN /ADVERTISED TENDERS :

13.1.1 There have been some cases in which the tenders were issued to the technically pre-qualified firms and, after receiving their offers on single bid basis, the offer of lowest bidder was rejected on technical grounds. In a case of supply and installation of Local Area Networking (LAN) system by a PSU bank in Delhi, the offers were asked in a single bid and the firms were required to enter their rates against the formatted BOQ (Bill of Quantities) sheet. Six offers were received. Five firms had quoted their rates against each item of BOQ. But one firm, in addition to furnishing rates against the pre-existing BOQ items, also added some more items and quoted against them, with the plea to equip the system with state-of-the-art technology. The bank officials, while evaluating the offers, not only considered the bid of the sixth firm which was the highest bidder but also awarded the work to them on the grounds that the offer given by the firm is technically superior to their own specifications.

- The single bid system is normally resorted to when the specifications are adequately defined and also the items being procured are standard equipments, designed and manufactured as per general industry standards. However, even for such items, there may be certain deviations in tender specifications vis-à-vis bidders' offers. In order to compensate for such deviations, a loading criteria, to be adopted, for evaluation purpose should invariably be indicated in the bid documents.

13.1.2 In some cases of the two bid system, it was noticed that the makes and technical specifications offered by various bidders are accepted without properly analysing the techno-commercial equivalence of such offers and in the process the bidders offering inferior specifications/makes get undue advantage. Similarly distribution of work is done in an ad hoc and arbitrary manner.

- (i) In a case for supply and installation of computer system the work was distributed among three firms for similar equipments at three different

rates and surprisingly the largest quantity (40%) was given to the highest bidder. Even worse, the repeat order was also placed on the highest bidder only.

- In case of the two bid system, techno-commercial negotiations may be conducted with all the bidders to clarify the deviations vis-à-vis tender specifications/requirements. After bringing the acceptable offers on a common platform, all the commercial terms/conditions and technical specifications, should be frozen. In case some changes are made in terms/conditions or technical specifications, the bidders may be given a fair chance to revise their price bids accordingly. The distribution of work, if considered necessary should be done in a fair and transparent manner.

13.2 LIMITED TENDERS

13.2.1 Some organisations issue limited tenders to their approved contractors, almost for all the works. However, there are instances when either the response is very poor or the offers are not responsive, as per the bid documents.

- (i) An oil sector PSU issued limited tenders to their approved contractors but only one firm responded. Due to the inadequate response, the date of tender opening was extended but still only one offer was received and as a result the work was awarded on the single offer basis at very high rates vis-à-vis the estimated cost. On examination, it was revealed that the firms who were short-listed for limited tenders were empanelled long back. So they had either colluded to form a cartel or were no more interested to execute the tendered works. In yet another case, one Government consultant first short-listed 8 firms for purchase of UPS for the computer system of a bank and called for the technical and price bids from all the 8 firms. However, after opening of the bids, the work was awarded to an L-4 firm and lower offers were rejected on technical grounds, who otherwise were short-listed based on their past performance and technical competence.

- In cases where firms are short-listed for issuing of tenders on limited basis, the techno-commercial competence and other credentials are required to be scrutinised thoroughly. After the offers from such short-listed firms are received, there should normally be no occasion to reject them on technical grounds. Further, since limited tenders are issued to the empanelled firms dealing in a specific item/job on the basis of their capacity and performance it is imperative to up-date the panel periodically.

14 POST TENDER NEGOTIATIONS

14.1 As per CVC guidelines circulated vide letter No.8(1)(h)/98(1) dt. 18.11.98, post tender negotiations except in case of negotiations with L-1 are banned. In continuation of these instructions, the following further clarifications were issued vide letter No.98/ORD/1 dt. 15.3.99 :

- (i) The Government of India has a purchase preference policy so far as the public sector enterprises are concerned. It is clarified that the ban on the post tender negotiations does not mean that the policy of the Government of India for purchase preference for public sector should not be implemented.
 - (ii) Incidentally, some organisations have been using the public sector as a shield or as a conduit for getting costly inputs. This should also be avoided.
 - (iii) Another issue that has been raised is that many a time the volume of work to be executed is much more than L-1 alone can supply. In such cases the work may be distributed in such a way that the same is done in a fair transparent and equitable manner.
- Despite the above instructions, there are instances of holding negotiations with the select/all bidders by some organisations in gross violation of these instructions. The instructions/guidelines circulated by CVC on the subject need to be followed strictly.

15. REASONABLENESS OF PRICES/MARKET RATE JUSTIFICATION

15.1 It has been noticed that works are awarded to the firms by virtue of being lowest among all the bidders without analysing and establishing the reasonableness of the quoted rates vis-à-vis the estimated rates and the prevailing market rates. In some cases even the Abnormally High Rated (AHR) and Abnormally Low Rated (ALR) items are not identified.

- (i) In one such case, regarding the supply and installation of air-conditioning plant, the work was awarded to L-1 firm at 20% higher than estimated rates. However, the officials of the department found these rates reasonable as compared with the prevailing market rates. It is interesting to note that the same officials had prepared the estimates based on the prevailing market rates approx. 3 months before award of work. Such manipulative practices have to be curbed.
- (ii) In yet another case for construction of Combined Effluent Treatment Plant (CETP) by a Government undertaking in Delhi, the work was

awarded on a turnkey basis to an L-1 firm at more than 100% higher rates compared to the estimates prepared by an independent Government agency. When called upon to justify these abnormally high rates, the officials woke up to the realisation that the estimates furnished by the agency were deficient and unrealistic, which hitherto were absolutely acceptable to the department.

- Before acceptance of the offer, it is very important to establish the reasonableness of rates on the basis of estimated rates and the prevailing market rates. The AHR and ALR items should be duly identified and the officials/agencies responsible for execution of work should be intimated to exercise appropriate control on such identified items.

16. AWARD OF WORK AND SIGNING OF CONTRACT AGREEMENT

16.1 In many cases, it is noticed that even if the offer of a particular firm is found acceptable, the work is not awarded within a reasonable time rather, it is prolonged intentionally. Since such delays are viewed as potential source of corruption, it is therefore, advisable that work should be awarded immediately and a formal letter of award should be issued within a reasonable time. In some cases, even though the work order had been issued long back and even the work had started at site, the formal contract agreement between the contractee and the contractor had however not been signed for months together or even in some cases, years together despite payments being made. In such cases, the work is executed without any contractual obligation on either party.

- In order to avoid any potential source of corruption, it should invariably be ensured that once the offer is found techno-financially acceptable, the work is awarded without any loss of time. All the necessary documents should be kept ready beforehand. Further to give the contract legal sanctity, a formal contract agreement containing all the requisite documents forming part of the agreement should be signed within a reasonable time.

17. ADVANCE PAYMENT & BANK GUARANTEE

- (i) As per CVC guidelines circulated vide OM No.NU/POL/19 dt.8.12.97, it has been brought out that payment of mobilisation advance should be made only in cases of select works and that the advance should be interest bearing so that the contractor does not draw undue benefit. However, it has been noticed that some of the organisations are quite liberal in allowing advance payments up to 20%, that too, totally interest free. The payment of interest free advance is in contravention of the guidelines issued by CVC.

- (ii) In some cases though the contract was bifurcated into supply and erection portions but while working out 20% advance payment, total amount of both the portions i.e. supply and erection was considered to the benefit of the contractor. It should be made clear that no advance payment is admissible for the erection portion of the contract.

- The advance payments need to be generally discouraged. Whenever the payment of advance is considered unavoidable, the same should be interest bearing as per CVC guidelines and should be allowed after getting an acceptable Bank Guarantee for an equivalent amount with sufficient validity. Timely action for revalidation/encashment of the bank guarantee also need to be taken so as to protect the Government interest.

18. PERFORMANCE BANK GUARANTEE AND INSURANCE

18.1 In some works, either the Performance Bank Guarantee is not stipulated at all or even if it is stipulated the amount of Performance Bank Guarantee/Security Deposit is too low in comparison to the contract value. The validity of Bank Guarantees is also not being scrupulously monitored and extension in the BG commensurate with the time extensions being sought, is not asked for, which is detrimental to the Government interest in the event of non-performance of the contract. Some organisations stipulate initial Performance Bank Guarantee (PBG) be submitted at the time of the award of work and be kept valid throughout the duration of the contract period and the defect liability period. But after award of the contract neither does the organisation insist on such PBG nor does the contractor furnish the BG, and at time furnishes this late thus getting a financial benefit in the process.

- In order to safeguard the Government interest, it would be appropriate to take reasonable amount as Performance Bank Guarantee valid up to Defect Liability period for due performance of the contract. The validity of the BG needs to be properly monitored and whenever the time extension for contract is granted, the validity of BG should also be appropriately extended. The date of submission for the BG should be clearly spelt out and adhered to at the time of the execution of the contract.

18.2 INSURANCE

18.2.1 The insurance clause in some cases is either found as not incorporated in the contract or the same is not complied with by the contractor and the department officials also do not insist on compliance. There are instances when the contract envisaged a comprehensive All Risk Insurance for the entire period of the contract but the contractor got the material insured only for transit purposes. In some cases, when the contract period is extended, the insurance cover is not simultaneously extended.

- Comprehensive insurance cover for men and materials apart from being a statutory obligation has to be provided in the contract to safeguard the interest of the organisation. Avoiding insurance cover may jeopardize the safety of men and materials and may result in serious legal complications in case of any mishap. Therefore, a comprehensive all risk insurance clause needs to be incorporated and implemented.

19 COMPLETION SCHEDULE OF CONTRCT

19.1 The completion period is the essence of any contract but the contract is rarely found to be completed as per the original completion schedule. It has been noticed that most of the organisations grant an extension of time in a liberal and routine manner. The LD clause is not invoked, in cases of delay. Even a proper delay analysis, to establish the cause of delay, is not made. Hindrance Registers, though are sometimes found as maintained at site but in most of the cases either entries are not made at all or bogus entries are made in collusion with the contractors. In quite a few cases rains during the monsoon were considered as hindrance and the benefit was given to the contractor.

19.2 In some cases, two different periods for completion of contract are stipulated; one for the supply portion and the other for erection portion. Keeping such stipulations is not in the interest of the contract as the contractor after making the supply may claim large portion of payments and then tend to respond sluggishly as the contractor's stakes are minimal. Moreover, in the case of delay in erection portion, the contractor will plead for an imposition of penalty only for erection part of the contract even if the LD clause stipulate penalty on entire value of the contract. There are cases where the contractor got paid 90/95% payment for the supply of equipments, but shirked the erection and commissioning work on one pretext or the other.

- The specific schedule of completion of contract should be stipulated in the contract in an unambiguous manner. Completion of contract should imply overall completion of all the events of the contract, in case of big projects. If the work is broken into small contracts, each and every contract should have its specific schedule of completion which inter alia should be within the overall completion schedule of the main contract. The contractors should be asked to submit the completion schedule of various activities in advance and the progress should be monitored in accordance with such schedule. The LD clause in case of delay in completion of work, should be invoked as incorporated in the contract agreement.

20. DEFECT LIABILITY PERIOD CLAUSE

20.1 The defect liability period clause incorporated by some of the organisations is quite sketchy. The extent of the contractor's liability is generally not spelt out clearly. The date from which the defect liability period starts is not clearly

indicated resulting in ambiguity in case the defect is detected in the work. Sometimes the date is reckoned from the physical completion of works but before due commissioning of the same. In some contracts of supply and installation of plant and machinery, the standard guarantee/warranty clause of 15 months from the date of shipment/dispatch and 12 months from the date of delivery, whichever is earlier is incorporated. In such cases, by the time the equipments are installed their guarantee/warranty is already over or sometimes a very short period of guarantee/warranty is available.

- (i) In a case for providing DG sets in a Hospital, the DG sets were procured by the organisation and stored at site. A separate contract for installation, testing, commissioning was finalised at much later stage resulting in lying of costly equipments unused for months together and jeopardising the guarantee/warranty of the equipments as the same was reckoned from the date of dispatch. On further examination of the case, it was revealed that though the administrative approval had clearly envisaged supply, installation, testing, commissioning of the DG sets through one contract but the executing authorities broke-up the work into two contracts, apparently, to favour a particular firm who was not meeting the PQ criteria if the work was executed on SITC basis.
- Detailed Defect-Liability period clause embodying all the safeguards needs to be incorporated in the bid documents and in the resultant contract. In the contracts involving installation/commissioning of equipments, the defect-liability period should be reckoned only from the date of installation/commissioning. However, in case supply and installation have to be executed through separate contract due to some compelling reasons, both the contracts should be processed in such a manner that the time-gap between supply and commissioning is minimal.

21. PAYMENT TERMS AND APPLICABILITY OF TAXES AND DUTIES

21.1 In some organisations, the payment terms kept in the bid documents are found same irrespective of the nature of the contract. The payment terms are either not updated suitably or left open to change, after the award of the contract. In one case, in the execution of a hydro-electric power project, the first few payments were allowed periodically without linking the same with the progress of the work. In cases where a price break-up for payment purpose is required, the break-up is done in a manner that favours the contractor. Similarly, in the turnkey projects where supply and installation are involved, the Sales Tax on Works/Works Contract Tax (WCT) is applied only on the erection portion without making any reference to the same in the bid conditions. In some cases, bigger firms sublet the manufacturing of major equipments to the firms located in priority areas and avail taxes and duties exemptions. Such exemptions are not extended to the end purchaser, i.e. the

Government departments and in the process the main contractor draws financial mileage.

- The payment terms should be defined unequivocally and should not be changed after award of the contract. An appropriate control on the flow of funds should be exercised while making the payments. As far as possible, the payments terms should be so structured that the payments made to the contractors are linked and commensurate with the actual progress of work. In case of contracts where a price break-up is required for payment purposes, the break-up should be realistic and should be approved by the competent authority. The rates so approved should be deemed tendered rates as if the rates were called for item rate contracts. These rates should be considered for making any proportionate recoveries or withholding of payments or for working out any taxes duties etc. In the case of a composite contract for supply and erection, the applicability of various taxes/duties should be made clear at the outset in the 'instructions to bidders' part of the bid documents.

22. POST CONTRACT MANAGEMENT

22.1 MODIFICATIONS OF CONTRACT CONDITIONS/SPECIFICATIONS

It has often been observed that after award of the contract, amendments/modifications that have financial implications are subsequently authorised in the contract conditions thus giving financial benefit to the contractors. Some of these are enumerated below :

22.1.1 The contract specifications are diluted to benefit the contractor. The makes and specifications as envisaged at the time of signing the contract are not insisted upon and alternate makes/specifications are accepted at the time of execution of the contract, that too without any financial implication. In one case, in the execution of a hydroelectric project, the contract envisaged a 125T EOT crane but the contractor supplied and installed a 100T crane. The organisation also accepted the same without making any cost adjustments while releasing the payment against this item

22.1.2 The payment terms are amended in a manner favourable to the contractor e.g. advance payments are authorised even when no provision exists in the contract for making advance payments. At times, higher advance payments than stipulated in the contract are authorised.

22.1.3 The factory inspection of certain items though incorporated in the contracts was however subsequently waived without any reasons, thus jeopardizing the quality aspects as per contractual requirement and financially benefiting the contractor.

22.1.4 It has also been often observed that submission of the Performance Bank Guarantee was either waived or the same was not extended even when the contract period was extended.

22.1.5 Some bigger equipments are received in a knocked down conditions and the payments are released against such items before getting them assembled thus the labour and other input charges required for assembling the equipments are paid in an unauthorized way or pre-maturely, hence giving a financial advantage to the contractor.

- After conclusion of the contract, any relaxation in the contract terms/specifications should be severely discouraged. However, in exceptional cases where the modifications/amendments are considered absolutely essential, the same should be allowed only after taking into account the financial implications. Further, a sufficient amount should be withheld against the items received in an unfinished/incomplete condition so as to ensure that no extra payments are made against such items/services.

22.2 POST CONTRACT MONITORING

22.2.1 It is felt that the post contract monitoring is generally handled in a casual and lackadaisical manner. It has been observed that due to a lack of coordination and the diversified approach followed by various agencies in the implementation of the projects, there are time and cost overruns.

22.2.2 In some cases, even after expiry of completion schedule stipulated in the contract and without extension of time granted by the owner, the departments keep on exchanging correspondence with the contractors and thereby the contract alive. This may result in serious legal complications if it is intended to cancel the contract.

22.2.3 Some organisations do not incorporate a liquidated damages/penalty clause for imposing a penalty in case of failure by the contractors to complete the contract within the stipulated schedule. The contractors quote short completion period and in the absence of deterrent conditions, in the contract, manage to obtain repeated extensions. Even in cases where the LD clause is stipulated; it is not invoked for delay in completion and no recoveries are made from the contractors, on some pretext or the other.

22.2.4 In a large number of cases, the contractors undertaking services contracts (viz. Electrical, Air-Conditioning, Lift, Fire-fighting, etc.) try to blame the Civil Contractor for delays therefore absolving themselves of any responsibility and officials meekly accept this argument without verifying the details, thus giving undue benefit to the contractor.

22.2.5 It has also been noticed that even though the contract clearly stipulates deployment of site supervisory staff by the contractor, with minimum requisite qualification and experience, but in practice the supervisory staff is invariably found with inadequate qualifications and experience and is also not employed for the full duration of the contract. The departments are found ignoring this important aspect thus jeopardising the quality supervision of the contract.

- It is essential to accord priority to the post contract follow up for execution of works. The time extension should be granted only on bonafide requests and not on a routine and casual manner. After expiry of the contract period, the contractee should refrain from exchanging correspondence with the contractor. For any delays on part of the contractor in completing the contract the liquidated damages clause should be invoked. In case more than one contractor are engaged on a project and delay occurs, the case should be analysed in a total perspective and the agencies responsible for the delay, including the consultants should be appropriately penalised. There is a dire need to inculcate a transparent and professional contracting culture so that the non-performers are weeded out and only reliable contractors, who can prove their credentials by persistent performance in terms of quality and timely completion of contracts, are encouraged.

PART - II

**COMMON IRREGULARITIES OBSERVED IN FIELD/SITE
INSPECTION OF VARIOUS WORKS**

“Integrity without knowledge is weak and useless, and knowledge without integrity is dangerous and dreadful”

1. ELECTRIFICATION WORKS (EXTERNAL & INTERNAL)

1.1. H.T. PANELS

Common deficiencies observed in HT Panels are enumerated below :

- (i) The size of bus bars in some of the cases was found less than the rated current carrying capacity.
 - (ii) In some cases, tripping current of switchgear was found to be higher than the current carrying capacity of bus bars.
 - (iii) The clearances in all directions of panels and gap between bus-bars were found to be less than the IS stipulations.
 - (iv) The construction material of the panel body is often sub-standard either due to poor quality of the sheet or due to lesser thickness of the sheet.
 - (v) In some cases, the highest operating points in the panels are positioned higher than the standard stipulations. As per practice, the highest operating switch in panels should not be above 1900mm from the ground level.
 - (vi) The CTs are sub-standard in make and the burden of CTs does not match with the requirement.
 - (vii) The make of the components / accessories is not mentioned clearly, thus leaving everything to the choice of manufacturer of the panels.
 - (viii) The control wiring inside the panels is found multi-stranded and sometimes even less than 2.5 sq. mm.
 - (ix) The selection of capacity of capacitor banks is done in a random manner and is not based on the actual inductive load in the circuit.
 - (x) The stacking of batteries is not done on corrosion resistant platforms and often even the acid is found split over the floor. Adequate ventilation for acid fumes is also not provided.
- Any tripping/faults in the HT part of the switchgear affects a wider area of supply. Therefore while designing the HT panels, an adequate factor of safety should be considered. The size of bus bars, side clearances of the panels, construction of materials, selection of components of HT panels should be strictly as per the relevant IS and the tender specifications and should conform to the IE rules.

1.2 TRANSFORMERS

Common deficiencies observed in transformer installation are as under :

- (i) The types of transformers are selected in an ad hoc manner. There are cases when outdoor type transformers are found placed inside the closed rooms without proper ventilation.
 - (ii) In one of the cases, though the cooling system specified for the transformers was air natural, but on site it was found that one more exhaust fan was installed at the top of the transformer to supplement the cooling system which made it a forced natural cooling system.
 - (iii) The type of winding material of transformer coils is not clearly specified which may be a potential cause of controversy at the time of execution.
 - (iv) The gap between the phases of end terminations of cables is found less than specified.
 - (v) The transformers are found with one body earthing and one neutral earthing instead of double body earthing and one neutral earthing.
 - (vi) The minimum clear distance as required in between the earthing and the equipment are not maintained and all the earth pits are sometimes found clustered in a small area.
 - (vii) In some of the cases, the clearance in all directions of the transformer is not found adequate as per the relevant IS specifications.
 - (viii) The arrangement for prevention of fire due to leakage or spillage of the transformer oil is not found adequate.
- The transformer is the heart of electrical installation/switchgear. The type and capacity of the transformer should be chosen with utmost care. All the relevant IS specifications should be strictly adhered to. There are certain restrictions in the installation of oil transformers in basements and in public intensive areas. Another key consideration for installing transformers is that the place should not be low lying as water collection near such installations may prove costly.

1.3 LT PANELS AND CABLES

Common irregularities observed in LT panels and cable works are enumerated below :

- (i) In a majority of these cases, LT panels are manufactured by subletting to small firms that are not even CPRI approved. Often their products are not type tested.
- (ii) The sheet thickness used for the panel body is found to be lesser than the specified dimension in some of the cases.
- (iii) In one case, the original specifications envisaged two MCC (Motor Control Centre) panels but on actual site, one panel with both side openable and installing switches was accepted without any financial adjustment.
- (iv) Sometimes, the specifications envisage provisions of MCCB while in actual fact SFUs (Switch Fuse Units) were provided at the time execution
- (v) There have been instances when incoming main was required with an ACB but instead MCCB was provided which gave financial advantage to the contractor.
- (vi) At times, the panels are not found to be of cubicle types as envisaged in the specifications.
- (vii) Sizes of bus-bars are found on lower side or sometimes the material of the bus-bar is changed from copper to aluminium giving a financial advantage to the contractor.
- (viii) Many a time, the thimbles used for termination of cables are found of unspecified makes. Even the thimbles are not properly crimped thus leaving air gaps, etc.
- (ix) In some cases the types of cables and the optimal size of cables are not properly mentioned thus leaving everything to the discretion of the contractor.
- (x) The XLPE cable in one case was originally envisaged but at the time of execution, the contractor supplied PILC cable which is an obsolete alternative.
- (xi) Mostly the, laying of cables is not done as per relevant IS specifications. Either the depth of trench is found less or brick and sand cushioning is found inadequate. The cables are abruptly bent near the panel for termination.

- (xii) In one instance, the cable was to be laid in a new trench, as per contract, but the contractor laid the cable in an existing trench, which was made to lay other cables, and claimed payment at the rates of laying a cable in the new trench.
- (xiii) There have been instances when laying and terminating the cables was one item of BOQ and termination of cables was another item which amounted to duplicity of work. But due to misinterpretation, the contractor claimed payments against both the items separately.
- (xiv) In the construction of the Head Office building of a bank, the LT switchgear was installed in a basement which was potentially hazardous due to chances of collection of water in the basement.

* LT panels are generally manufactured by small firms, therefore, in order to ensure the requisite quality and safety, CPRI approval should invariably be asked for the type of switchgear they are authorised to manufacture. Types of switches ACB, MCCB, SFU, etc. should be explicitly defined in the contract specifications. Similarly, the type and size of cables required for the work should also be categorically mentioned beforehand. Items of BOQ should be chosen with due care so as to avoid any duplicity of works which may result in overpayment to the contractor.

1.4 INTERNAL ELECTRIFICATION

Common deficiencies observed in internal electrification work are enumerated as under :

- (i) The conduit size with its class are not clearly specified resulting in the supply of sub-standard material of contractor's choice.
- (ii) The maximum number of wires in each conduit pipe is not found strictly as per the relevant IS.
- (iii) In some cases, the wire sizes and the thickness of conduit pipes are found to be less than specified.
- (iv) In some cases, a single switch box was found with two incoming phases. This is a safety hazard and violation of ISS.
- (v) Switch-boards are not properly flushed and bakelite sheets are found in bent position.
- (vi) Metal boxes are found without proper provisions of earth termination arrangements.

- (vii) In many cases, terminations of conduits are not provided with check nets to ensure continuity. Also, rubber bushes are not provided in the conduit in the MS boxes so as to draw the wire safely and without causing any injury.
- (viii) The gap between clamps is found more than as specified in relevant IS specifications.
- (ix) Fish-wire is found of lesser size and is generally not found inserted during the laying of conduits.
- (x) The sheet thickness and depth of MS-box is found as being less than specified.
- (xi) In some cases, joints are provided in the point wiring even without proper insulation / connectors.
- (xii) In some cases, the junction boxes were found used for the fan connections. Also ceiling roses for fans/exhaust fan point are not provided.
- (xiii) In quite a few cases, it is found that the height of switchboard for light points and the light/power sockets is not 1.2 meter and 23 cms. respectively, from finished floor level as stipulated in relevant IS specification.
- (xiv) Mostly, the earth-pit dimensions are found less than as stipulated in the contract. As per relevant IS, the cover-thickness of earth pit should not be less than 10mm and the dia of the MS rod should not be less than 6 mm.
- (xv) In a majority of the contracts, the polarity test of all the switch/sockets is not conducted and certified by competent authority.

* For any internal electrification work, the size and quality of conduit pipes, cross section and thickness of insulation for wires and quality of circuit breakers should be given due attention as these items form the most critical part of the installation. All relevant IS specifications should be strictly adhered to at the time of execution of IE work.

2. AIR-CONDITIONING WORKS.

The common irregularities noticed in the air-conditioning works are as under :

2.1 HEAT LOAD CALCULATIONS

In most of the cases, the designing of plants is found to be done on higher side. The ambient peak temperatures for short times are considered for heat load calculations. Also the heat generation load of various equipments and human occupancy is kept on an unrealistically higher side. All these factors result in over-designing and thus perpetual under utilisation of the plant.

- Heat load calculations should be based on the ambient conditions prevailing over a considerably large period so that the design parameters are realistically selected and the system is utilised optimally. Also the other inputs for heat load calculations, like occupancy rates, equipments load, etc. should be taken on a realistic basis only.

2.2. CHILLERS

The selection of type of cooling is found to be done in an ad hoc manner. There have been instances when air cooled chillers were used while the highest temperature touched 45^o or above and there was no scarcity of water in the area. On the other hand, the water cooled chillers were used in some southern part of the country with an acute shortage of water where probably air cooled chillers would have been a better choice. In one more instance of irrational choice of type of cooling, one organisation went for a mix type of chillers, i.e. 50% air cooled and 50% water cooled, which has not only resulted in a mismatch but also resulted in maintaining two types of spares which is a costly affair.

* Since the type of chillers affect the overall performance of the air conditioning plant, therefore the selection of cooling should be done with due care. Generally, the type of chillers are based on climatic conditions, the size of the plant and availability of water, etc.

2.3 COMPRESSORS

- (i) There are instances when two compressors of half the capacity are accepted in place of one unit of double the capacity as envisaged in the contract.
- (ii) Sometimes, even the type of compressors envisaged is left open till execution of the item and thus a free hand is given to the contractor to

supply the compressor of his choice, i.e. open type, hermitically sealed or semi-hermitically sealed.

- (iii) In some cases, though reciprocating type of compressors were envisaged in the tender specifications but the contractor supplied screw chillers of lesser capacity on the plea that screw chillers are more efficient thus, fulfillment of contractual obligations is not established.
 - (iv) In most of the Government Department Works, the specifications of compressors and other accessories are generally based on a particular model of a particular manufacturer in a vague manner, when it comes to supply of items, the model numbers envisaged in the tendered specifications are not found matching with the model actually supplied.
 - (v) In one case, the model number envisaged in the tender specifications was changed during some technical negotiation with the successful bidder. But at the time of actual execution, even the model supplied was not found matching with the agreed model.
 - (vi) In some cases, the motor rating of the compressor motor is envisaged as being 10% higher than the full load requirement of the compressor. But since most of the manufacturers supply a factory built motor compressor unit, which normally does not have motors with a 10% higher capacity, consequently 100% conformance is not ensured.
- The model number, capacity of compressor and motor should be explicitly indicated in the tender specifications so as to avoid any controversy at the time of execution. Also the type of compressors should be decided before hand to avoid any subsequent interpretations.

2.4 CONDENSERS

- (i) Though in the contract, the make of condensers are normally the same as the compressors but at times it is found that condensers are of some local and less reputed make.
- (ii) In one case the overall length and dia of condensers were found lesser than the stipulated dimensions.
- (iii) The dia and thickness of copper tubes used in the condense were found less than specification in some cases.
- (iv) The linear density of fins was also found less than the specifications.
- (v) The inlet and outlet temperatures of water and refrigerant are either not specified in the tender or not adhered to by the contractors.

- The overall length and dia of the condenser, the dia and thickness of copper tubes and the linear density of fins decide the performance of a condenser and are very important parameters. Therefore, these parameters should invariably be checked and it should be ensured that these are of tendered specifications before installations.

2.5 CONDENSER AND CHILLED WATER MOTOR-PUMP SETS.

- (i) The type of coupling of motor-pump set is either not mentioned in the contract specifications or not adhered to at the time of execution of work.
 - (ii) In some cases, the impeller of pump was found to be of cast iron as against brass as envisaged in tender specifications.
 - (iii) Invariably the type of protection of motors and class of insulation is found to be at variance with the specifications.
 - (iv) Even the motor rating and rpm was found lesser than the specifications.
 - (v) There have been instances when horizontal split casing pumps were envisaged in the tender specifications but actually monoblock pumps were provided at site.
- The type of casing of pump sets rating and rpm of motors should be clearly mentioned in the tender specifications. Besides, the material of construction of impellers and type of protection and class of insulation of motors are also critical items, which need special attention.

2.6 AIR HANDLING UNITS

- (i) In some cases, the double skin AHUs were envisaged in the tender specifications but at actual site, single skin AHUs were supplied by the contractor.
- (ii) There was a case when the provision of double blower AHU was agreed upon as a substitute item though there was no change in the CFM of AHU vis-à-vis single blower AHU. But there was a significant change however in the price of substituted item.
- (iii) The face area of cooling coils was found lesser than the specified and/or drawing dimensions.
- (iv) The detailed tender specifications were not found matching with the actually installed AHUs. The plea given for such deviations are that

AHUs are standard items and are supplied as factory built items from the manufacturers of AHUs.

- (v) The rating of motors, used in AHU was found less than the actual requirement resulting in over heating of the motors. Also, the single phase preventors were not provided in these motors.
 - (vi) Almost in all the cases, the specifications envisage provision of AVMs (Anti-Vibration Mountings) for installation of AHUs but there were hardly any instances where AVMs of reputed make were provided. Most of the places, rubber pads are used instead of AVMs.
 - (vii) Similarly, the AHUs are envisaged with noiseless operation but in very few cases, the noise level was measured after installation of AHUs.
 - (viii) Even the sheet thickness of enclosure of AHUs was found inadequate when compared to the specifications.
 - (ix) In most of the cases, the AHUs are located in cramped spaces with the result that maintenance and upkeep of AHUs become very difficult. In one case, the AHUs were installed in a loft inside a big auditorium which would create unpleasant noise inside the auditorium
 - (x) In one case, a large number of small AHUs were installed in a scattered manner to cater to the library of the training institute. Such large areas are generally provided with a big AHU of suitable size in order to save space as well as cost.
- The cooling impact of any AHU is mainly judged by the CFM and cross section area of the cooling coils. Therefore, it should be ensured that these two parameters strictly conform to the specifications. Besides, since these units normally run in unmanned areas, the fault detection and prevention action thereon should therefore be given due priority.

2.7 DUCTS, GRILLS AND DIFFUSERS

- (i) The degree of galvanisation of GI sheets was found inferior to the specified grade in some of the cases.
- (ii) Even the thickness of sheet was found less than specified in quite some cases.
- (iii) In some cases, either the insulation of GI sheets was not properly specified in the tender documents or the same was not found conforming to the specifications.

- (iv) Sometimes the thickness of sheet was not matching the cross-section of duct and thus violated the stipulations of relevant ISS.
 - (v) Invariably the supports used for hanging the ducts are found at more distances than specified.
 - (vi) Even the dia of hanging rods was found less than minimum requirements.
 - (vii) In some cases the dimensions of grills were found less than specified.
- The ducts are important link between AHUs i.e. source of generation of conditioned air and the area to be air-conditioned. The heat gain or heat loss in ducts or any leakage in the ducts may have adverse effect on the overall performance of the AC plant. Therefore jointing of ducts and insulation of ducts besides quality of sheets should be given due attention.

2.8 COOLING TOWERS

- (i) The makes of cooling towers are restricted to one or two only whereas there are quite a number of firms manufacturing the cooling towers
- (ii) Thickness of FRP sheets used for manufacturing the cooling towers are not mentioned in specifications in most of the cases thus giving free hand to the suppliers.
- (iii) In quite a few instances, though the material of fan blades was envisaged as cast aluminium but actually the contractor supplied fans made of FRP on the plea that cooling towers are factory built items and bought out from trade.
- (iv) In some cases the cooling towers with same model number were found used. For example, for a range of tonnage of the CT from 75 ton to 90 ton, same model was found to be used.
- (v) In most of the cases particularly with cross flow cooling towers, ladders are not provided even if specifications envisage provision of ladders.
- (vi) In some cases the cooling towers were to be installed on RCC foundations which was included in the BOQ but at actual site, the cooling towers were installed on the RCC beams of the civil work of the building thus giving financial benefit to the contractor.
- (vii) The colour and thickness of PVC fills used in the cooling towers are either not specified in the tender or are not adhered to as per specifications.

- An efficient cooling tower can, to a great extent lessen the burden on other equipments of the AC plants. Even one degree fall in temperature of outlet water of cooling tower can improve functioning of plant significantly. Therefore, the capacity of fan, colour and density of PVC fills, sprinklers and nozzles, etc. should be carefully chosen and strictly adhered to at the time of execution.

2.9 PIPES AND FITTINGS

- (i) The grade and sizes of pipes in some of the cases was found to be used in ad hoc manner and the makes were not from the approved list.
 - (ii) The valves and fittings are also found supplied from less reputed firms and not as per specifications.
 - (iii) The thickness of insulation and cement plastering is invariably less as compared to specifications.
 - (iv) The item of pipes and fittings in most of the cases is kept as lot instead of making it linear measurable item so as to ensure market rate justification of these items.
 - (v) In some of the cases the proper colour coding of the pipes and direction of flow marks were not made on the pipes.
- The selection of pipes of different size should be done on a realistic basis. Also only reputed and standard makes of pipes and fittings be envisaged in the tender specifications and adhered to at the time of execution.

2.10 GENERAL WORKMANSHIP

- (i) Jointing of G.I. ducts is not found as envisaged in the specifications. In one case, the tender specifications envisaged slip joints but the ducts were jointed with riveted joints.
- (ii) The insulation inside ducts and pipes etc. was done in an unskilled manner as the same was found peeling off at a number of places.
- (iii) The acoustic insulation applied in a plant room was found to be done in a shabby manner. The glass wool used was not uniformly spread on the wall and lump formations were seen at many places.
- (iv) The aluminium foil used for wrapping (cladding) the duct insulation not given proper finish.

- (v) The canvass used at the joint of AHUs and ducts are found either torn or extricating from the joints thus resulting in leakage of air.
- Besides, sound material the skillful workmanship can add to the sheen of any project. Therefore, in order to ensure efficient and flawless running of AC plants, the installation of different parts of AC plants should be got done by skilled workmen only.

3. LIFTS / ELEVATORS

3.1 MACHINE ROOM

Common irregularities observed in the design of machine rooms for equipments of lifts are as under :

- (i) The access to machine rooms was allowed even to unauthorised persons, thus jeopardizing the safety in the use of lifts.
- (ii) In some cases, the dimensions of machine rooms were found less than the tender specifications.
- (iii) The laying of equipments inside the machine room was not done in a planned manner which gave a shabby and clustered look.
- (iv) In some cases, the dynamic and static colour coding was not applied as per relevant standards.
- (v) There have been instances when the ventilation in the machine room was found inadequate and the electronics components were found getting heated up abnormally.
- (vi) In certain cases even the instructions pertaining to rescue operations by the operating staff were not found displayed inside the machine room.
- (vii) In one case the type of drive envisaged was variable voltage control DC drive instead of thyristor controlled AC drive. Since the variable voltage DC drives are phased out, the machines with these control shall have maintenance problems. Therefore, the latest technology viz. thyristor control as drive should be opted for the lifts.
- (viii) In yet another case of replacement of old existing lifts in a reputed hospital in Chandigarh, the machine room equipments particularly the motors and control panels provided were of some foreign make despite the fact that there are quite a large number of indigenous manufacturers for motors and other accessories for the lifts. The imported equipment shall not only be difficult to procure in case of replacement but maintenance of spares shall be a costly affair.
- (ix) In the above cited case, the batteries used for control purpose were found placed in ARD (Automatic Rescue Device) unit thus making the entire unit very congested. The batteries were required to be placed in the battery stack to be provided separately.

- Generally, the machine rooms of lifts are unmanned and therefore proper lock and key arrangement is essential so as to ensure the entry of only authorised persons and thereby avoiding any intentional or accidental mishandling of lift equipments. Further, since the critical equipments for lifts are placed inside the machine room and these equipments generate heat when in use, therefore proper ventilation should also be ensured to dissipate the heat. Lastly, all the safety instructions for operators and rescue personnel should be displayed inside the machine room in a conspicuous manner.

3.2 LIFT CARS

The illustrative list of deficiencies observed in the lift cars is as under :

- (i) In one case, the guide shoe rollers in the lift car were not envisaged at the initial stage, but at the time of execution, guide shoe rollers were provided at a high cost without any financial justification of these items.
- (ii) The factor of safety of lift rope is not tested and established in most of the cases.
- (iii) In a majority of the cases, the emergency alarms/telephones are found either bypassed or rendered out of use over period of times.
- (iv) In most cases, abnormal misalignment is found between the car floor and the silt. The reason for the abnormal misalignment is generally attributable to the maladjustment of limit switches.
- (v) In some cases, adequate ventilation is not provided inside the lift car. There are instances when even the stipulations of IS 4666 (clause 8.2) are not complied with properly in terms of adequacy of ventilation in the lift car.
- (vi) There are certain cases, when the thickness of brass sheet used inside the lift car is found less than the tender specifications.
- (vii) Although the IS specifications stipulate conspicuous display of Dos and Don'ts for safety in use of the lifts but in a majority of cases, either the instructions are not displayed at all or the same are displayed in a very inconspicuous manner.
- (viii) In some cases, the ceiling height of the lift cars was found quite less and even the illumination level inside the car was inadequate.

- The size of the lift cars should commensurate with the carrying capacity of the lift. The interiors and type of shoe, etc. of cars should be decided before-hand in the tender specification. All the safety instructions should also be displayed preferably bilingually in a conspicuous manner inside the lift cars. Besides, provision of recorded sound with alternative audio clippings in local language and in English/Hindi should also be made announcing the instructions to be followed in case of the accidental stopping of lift. In order to improve safety in the lifts, the length of the toe guard should be increased appropriately in order to reduce the gap between the landing silt and the lower edge of the toe guard so as to prevent any accidental fall through the gap. Further, in case the car stops away from floor level due to power failure, the trapped passengers, in panic, may fiddle with the electro-mechanical latch in the landing door which may be accessible from the car. Therefore, in order to avoid such situation, the electro-mechanical latch should be so designed that it is inaccessible or invisible to the passengers in the car.

3.3. SHAFT

The common irregularities noticed in the shafts of lift works are enumerated as under :

- (i) In most cases, the illumination level in the lift shaft is found inadequate either due to non-provision in the tender specifications or due to non-conformance to the specifications.
 - (ii) In majority of the cases, the buffer springs are not checked to test their compression which should be minimum 250 mm as per IS specifications.
 - (iii) In some cases even the lengths of buffer spring and counter weight spring were found less than the stipulated values.
 - (iv) In quite a few cases, the earthing strips provided in the lifts are either not clamped properly or the distance between clamps is found more than specified.
 - (v) In some cases, the depth of the car pit was found to be less than specified.
- In order to have hassle-free maintenance and operation of the lift the shaft of the lift should be adequately illuminated. Further the earth strips should be properly clamped in conformance to the specifications.

3.4 TESTING OF THE LIFTS

Before putting any lift to use, there has to be a statutory test and certification from the lift inspector. But the following deficiencies are noticed in respect of various tests conducted or required to be conducted on the lifts.

- (i) In more cases, the lift doors are neither tested for a fire withstand rating nor is any certificate obtained from the manufacturer.
 - (ii) Free fall test is not conducted in most of the works of installation of lifts, neither is the same certified by the lift inspectors.
 - (iii) Mostly, the lift training cables are not tested for fire retardance and moisture resistance.
-
- Safety in use of lifts has to be given the top priority. Therefore all the tests stipulated by IS specifications should be done in a stringent manner. However, in case the conducting of test is not feasible, a certificate to that effect should be obtained from manufacturer or from the Lift Inspector.

4. FIRE DETECTION & FIRE FIGHTING SYSTEM

4.1 CONROL PANELS, CONTROL CABLES, DETECTORS, HOOTERS

These items form part of the integrated control and detection system for fire-fighting arrangement. Common irregularities observed in these items are enumerated below :

- (i) In the case of a reputed Bank, the provision for a microprocessor based control panel was envisaged in the tender specifications but at actual site, a conventional panel with some solid state switching arrangement was supplied without any techno-commercial considerations.
- (ii) In some cases, the number of detectors in each zone of main control panel are found at variance with the standard stipulations.
- (iii) In most cases, the distribution of smoke and heat detectors is not found in a reasonable and justified manner. At some places, the number of detectors is found as being unreasonably high despite the fact that the area may not be a fire prone one. On the other hand, a lesser number of detectors are installed in fire hazardous places.
- (iv) At times it is found that the fire fighting system installed is not of the appropriate type required for the particular fire hazard. For example, the electrical installation should be provided with sand buckets and carbon foam fire extinguishers but at many places, these provisions are not strictly adhered to.
- (v) In some cases the main control panel, sector panel and zone panels supplied are not even TAC (Technical Advisory Committee) approved.
- (vi) In some of the cases, the main control panel and sector panel are found to be of patch cord or normal / conventional wiring type instead of adaptor cord system.
- (vii) In some cases, the base of the detector does not conform to the specifications and at times even the makes are not approved ones. The base of detector is an item which is rarely checked properly and in most of the cases, it is found to be of spurious make instead of standard make.
- (viii) There were instances when the smoke detectors and heat detectors were not matching the ambient conditions of the place of installation. The detectors were designed to work at a particular temperature. On further examination, it was revealed that the ambient temperature was higher

than the detection level of these detectors and hence the chance of false alarms were high. Due to these false alarms, these detectors are generally by-passed.

- (ix) Almost in all the cases, the signal cables, which are used in bulk in fire-fighting detection, are not tested from a reputed laboratory even on a sample basis.
 - (x) In most cases, the tender specifications envisage branded and reputed makes of hooters but at actual site, locally made hooters are found installed.
- Timely detection of fire can avert a catastrophe. Therefore, it is needless to emphasise that the main control, zonal control, detectors, cables, etc. should be selected with utmost care conforming to latest technology, high quality standards and suiting to the particular place of installation. Further, though there is statutory obligation for seeking clearance and approval for using the fire fighting installations, yet it is found advisable to seek pre-installation or stage inspection of such works so as to avoid any major alterations/modifications at the final stage of installation.

4.2 MAIN AND JOCKEY PUMPS

The common irregularities observed in these items are enumerated below :

- (i) In some cases the capacity of motor was found less than the rated capacity of prime mover of the pump.
- (ii) In yet another case of fire fighting work in a training institute of a bank, the capacity and head of the main pump was found less than the tender specification.
- (iii) There was an instance when the jockey pump did not start automatically even while the standing pressure of hydrant line fell below the threshold value.
- (iv) In one case the engine-pump was not found isolated from the main hydrant line with the results vibrations were traversing in the hydrant line which is a detrimental situation for the installation.
- (v) In one of the cases of Diesel-Engine-Pump Set, the exhaust pipes were not wound with asbestos rope as stipulated in the specifications thus leaving chances of accidental human contact to the heated part of the engine.

- The capacity of engines and the rating of prime movers should be chosen with due care. Also all the interlinking controls should be tested periodically to ensure operation of equipments. In order to avoid transmission of vibrations of Engine, Pumps, etc. to the main hydrant lines, a flexible coupling between the pump and hydrant line should be provided.

4.3 PIPES AND FITTINGS

The common deficiencies observed in the pipes and fitting of fire fighting works are enumerated as under :

- (i) In some cases the grade(class) of pipes was found Class 'A' which is inferior to the minimum specified grade, i.e. 'Medium' (Class 'B')
 - (ii) In most cases, GI pipes were found jointed with threaded coupling as against specified flange welded joints.
 - (iii) In some cases, the non-return valves and the sluice valve above 65 mm dia were provided without wheel arrangement and even the direction of rotation was not indicated.
 - (iv) There have been instances when a single outlet was provided in place of gun metal double outlet as envisaged in the tender documents.
 - (v) In quite a few cases, the dia of primary hose nozzle was found less than 20 mm i.e. the minimum stipulated size as per relevant IS standards.
 - (vi) In some of the buildings, the location of hose reels and hydrant outlets are found completely covered by wooden panelling.
 - (vii) In some cases even the inscription "Fire Hydrant" and other indications with red paint on doors, etc. were not displayed.
 - (viii) There were instances when the water sprinklers provided with quartz bulbs were found obstructed/hidden inside the false ceiling/ plastering.
 - (ix) In some cases, the hose reel cabinets were found insufficient for the movement of the reel to a minimum of 120° from its original position.
- Since the Hydrant Lines are required to maintain constant pressure, therefore, the grade and quality of pipes should not be compromised under any circumstances. All the fire fighting equipments should be give proper colour coding and indications, etc. wherever required. The location of hose reels should be in a conspicuous position and with free access. The sprinklers and nozzles should be installed without any obstruction.

**“I would prefer even to fail with honour
than win by cheating”**

“By unrighteousness men may prosper, men may attain what they desire but they perish at the roots”