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38. DESIGN MIX CONCRETE

Designing (proportioning) of concrete mix or design mix concrete is a trial and error method in which right proportion of ingredients is determined to achieve targeted mean strength of the concrete which is kept some what higher than the characteristic compressive strength of the concrete. The workability and durability requirements are also required to be ensured while designing the concrete mix. The designing process is usually carried out through reputed laboratories. IS 10262-2009 is the relevant Indian Standard stipulating guideline for concrete mix proportioning.

a) Economy and Environmental issues.

Some important economy and environmental issues pertaining to design mix concrete are discussed hereunder:-

i) **Use of fly ash** Fly ash is a waste product in thermal power generation & this harmful material is a very useful material in civil construction as it has got very good pozzolanic properties and up to 35% of the cement content in concrete can be substituted with fly ash without sacrificing strength and achieving durability and economy in the construction. The quality parameters of fly ash for use in concrete are laid down in IS 3812(part-1).

The tender documents should not discourage use of fly ash in concrete as the same approach is not backed by any scientific reasoning. The use of fly ash in concrete should be promoted not only from environmental consideration but also for economizing construction cost.

ii) **Use of PPC** Use of PPC in concrete helps in environmental conservation and for economizing construction cost without sacrificing strength and achieving durability and economy in the construction. IS Code permits use of fly ash based Portland Pozzolana Cement (PPC) conforming to IS1489 (part-1) in concrete. Besides being cheaper it is more environmental friendly compared to OPC since it utilizes the fly ash in its manufacturing.

iii) **Specifying high quantity of cement in tender documents** Quantity of cement in design mix concrete depends upon several factors, chiefly on workability requirement as given in table under Para 7.1 of IS 456-2000. Higher workability requirement should be met by use of suitable chemical admixtures (super Plasticizers/ water reducing admixtures) to reduce water requirement in the concrete. The design process takes care of various factors affecting strength, durability and workability of concrete. Table 5 of IS Code 456 specifies minimum cement content, maximum Water-Cement ratio and minimum grade of concrete for different exposures with normal weight aggregates of 20 mm nomination maximum size and is given below:

Sl No	Exposure	Plain Concrete			Reinforced concrete		
		Minimum cement concrete Kg/cum	Maximum free Water-cement Ratio	Maximum Grade of concrete	Maximum cement content Kg/cum	Maximum free water cement Ratio	Maximum Grade of concrete
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	-	300	0.55	M 20
ii)	Moderate	240	0.60	M 15	300	0.50	M 25
ii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40

Cement content prescribed is irrespective of the grades of cement and it is inclusive of mineral admixtures, i.e. Pozzolanas, fly ash, silica fume, rice husk ash, Matakaoline, ground granulated blast furnace slag.

The maximum cement content specified ranges from 300 to 360 kg per cum of concrete for various exposure conditions and for various grades of concretes. The maximum cement content in concrete in normal course is also limited to 450 Kg per cum of concrete as per 8.2.4.2 of IS 456. By specifying cement content much higher than the stipulation in IS 456, the entire purpose of designing concrete in economical and environmental friendly manner is lost. Besides wastage / pilferage, this approach also gives rise to scope for wastage and pilferage under cement in actual execution.

iv) High quantity of Cement in Mix design Report:- Sometimes very high quantity of cement is sometimes specified in the design mix by the laboratory and therefore, the concerned Engineer should thoroughly check the design mix report particularly from economic angle and if the use of water reducing admixtures or plasticizers can help in reduction of water cement ratio and subsequent reduction in high quantity of cement prescribed in the design mix report particularly for higher grade of concrete where reduction in water cement ratio to value of 0.30 to 0.45 is needed. Thus, a design mix report showing very high cement content should be accepted only after critical scrutiny.

The followings are the cement contents for various grades of concrete beyond which design mix report should be critically examined and rechecked:

Grade of concrete	Cement content in kg. per cum of concrete
M 15	250 to 300
M 20	280 to 330
M 25	310 to 360
M 30	340 to 390
M 35	360 to 420
M 40	380 to 450
M 45 to M 55	400 to 450

The above cement content (if OPC used) can be further reduced up to 35% by use of fly ash.

(For details: Technical paper by Nirmal Goel, Technical Examiner, CVC on "Design Mix Concrete – Economy and Environmental issues")

b) Deficiencies noted by CTEO

The provisions of IS 456:2000 should be followed for designing of concrete mix & for accepting criteria. It was noted by CTE during inspection that the concrete was accepted on the basis of false certification and without actually testing of cubs for 28 days strength in some cases. The deficiencies are brought to the notice of all organization for immediate corrective action.

1. Minimum cement content, maximum water cement ratio and minimum grade of concrete for different exposures are not adopted as per the details given in Table 5 of the IS 456: 2000 code.
2. Value of standard deviation is not being established on the basis of results of 30 samples as provided in table 11 of the above code even for works where more than 30 samples have been tested.
3. For acceptance criteria means of a group of 4 non overlapping consecutive test results is not being calculated.
4. The samples where individual variations are more than +15% of average of three specimens are not declared invalid as per the provision of clause 15.4 of the code.
5. The concrete is being declared meeting the acceptance criteria which is not in conformity of codal provisions.

All organization are directed to ensure that provisions of IS 456:2000 read with amendment no. 3 should be followed scrupulously for cement concrete and reinforced cement concrete.

(For details: - CVC Circular No. 34/10/10 dated 7th Oct. 2010 on "Design Mix Concrete")

39. IMPORTANT REVISIONS VIDE AMENDMENT NO. 3 AUGUST 2007 TO IS 456 : 2000

1. Concrete of grades lower than those given in Table 5 may be used for lean concrete, foundation for masonry walls or temporary reinforced concrete construction'
2. Congestion of reinforcement should be avoided during detailing. Various methods such as choosing the diameter and grade of steel carefully and bundling of reinforcement, if required, are available.
3. Lap splices shall not be used for bars larger than 32 mm. Bars larger than 32 mm shall be welded (see 12.4) or mechanically spliced.

4. The use of 4 percent reinforcement may involve practical difficulty in placing and compacting concrete, hence lower percentage is recommended.

a) **Self Compacting Concrete**

J-1 GENERAL

Self compacting concrete is a concrete that fills uniformly and completely every corner of formwork by its own weight without application of any vibration, without segregation, whilst maintaining homogeneity.

J-2 APPLICATION AREA

Self compacting concrete may be used in precast concrete applications or for concrete placed on site. It may be manufactured in a site batching plant or in a ready-mixed concrete plant and delivered to site by truck mixer. It may then be placed either by pumping or pouring into horizontal or vertical forms.

J-3 FEATURES OF FRESH SELF COMPACTING CONCRETE.

The following are some of the features of self compacting concrete:

- a. Slump flow: 600mm, Min.
- b. Sufficient amount of fines (0.125mm) preferably in the range of 400 Kg/cum to 600 kg/cum. This can be achieved by having sand content more than 38 percent and using mineral admixture to the order of 25 percent to 50 percent by mass of cementitious materials.
- c. Use of high range water reducing (HRWR) admixture and viscosity modifying agent (VMA) in appropriate dosages.

(As per annexure-J of amendment No.3 August 2007 to IS 456: 2000)

Guidelines for Self Compacting Concrete are available as a free download from www.efnarc.org

40. FIBER REINFORCED CONCRETE

1. Fiber Reinforced Concrete (FRC) is a technology, which addresses some basic shortcomings of concrete as commonly produced. It renders the concrete with vastly improved performance characteristics, suitable for a range of applications.
2. Concrete is inherently a brittle material with low tensile strength and limited ductility. Contribution of the conventional steel reinforcements in RCC construction in taking care of the tensile stresses is limited in its own plane.
3. Fibers may be added to concrete for special applications to enhance properties, for which specialist literature may be referred to. (As per 5.7 Fibers of amendment No.3 August 2007 to IS 456: 2000). Fibers influence the mechanical properties of

concrete (and mortar) in all modes of failure especially those that induce fatigue and tensile stress. The various types of fibers that can be used in cement based composites are steel, glass polypropylene, asbestos and natural fibers.

4. Fiber efficiency and the fiber content are the important variables controlling the performance of Fiber Reinforced Concrete (FRC). Fiber efficiency is controlled by the resistance to pullout, which depends on the bond at the fiber matrix interface.
5. FRC finds application in hydraulic structures like dams, spillways, tunnel lining, underground roof support with shotcrete, roads and airfield pavements, runways and taxiways, overlays, industrial floors, blast resistant structures, repairs and restoration and many others. Improved ductility is of advantage in earthquake resistant structures.

41. EXAMINATION OF PUBLIC PROCUREMENT (WORKS/ PURCHASES / SERVICES) CONTRACTS BY CVOS.

The field staff should be well conversant with the provision of the manuals and the guidelines issued by the commission/ CVOs from time to time. A number of booklets have been issued by Chief Technical Examiner Organization of the Commission bringing about the common irregularities/ lapses noticed in different contract. A manual for intensive Examination of Works/Purchase Contracts and guidelines on tendering have also been issued which are available in the Commission's web site. For download the manuals, visit CVC web site: <http://www.cvc.nic.in>.

The commission emphasis the need for close scrutiny of the public procurement (Works/Purchases/Services) contracts to ensure that the laid down systems and procedures are followed, there is total transparency in the award of contract and there is no misuse of power in decision making.

On basis of lapses noticed by the Chief Technical Examiners Organization, a checklist has been prepared for examining procurement contracts. It should be ensured that the lapses previous noted are not repeated. The check list is placed for the benefit of the field staff & special care should be taken on the issues so mentioned (For details: - CVC Circular No. 21/05/06 dated 1st May 2006)

a) Check list for examination of Procurement (Works/ Purchases/ Services) Contract.

A. Pre-Award Stage

1. Financial and Technical sanction of competent authority is available.
2. Adequate and wide publicity is given. Advertisement is posted on website and tender documents are available for downloading.
3. Convenient tender receiving/ opening time and address of the tender receiving officials/tender box are properly notified.
4. In the case of limited tender, panel is prepared in a transparent manner clearly publishing the eligibility criteria. The panel is undated regularly.
5. Pre-qualification criteria are properly defined/ notified.

6. Short listed firms/consultants are fulfilling the eligibility criteria. There is no deviation from notified criteria during evaluation.
7. Experience certificates submitted have been duly verified.
8. Tenders/ bids are opened in the presence of bidders.
9. Corrections/omissions/additions etc., in price bid are properly numbered and attested and accounted page-wise. Tender summary note/ Tender opening register is scrupulously maintained
10. Conditions having financial implications are not altered after opening of the price bids.
11. In case of consultancy contracts (a) Upper ceiling limit is fixed for consultancy free (b) Separate rates for repetitive works are fixed

B. Post-award stage.

(a) General

1. Agreement is complete with all relevant papers such as pre-bid conference minutes, etc.
2. Agreement is page numbered, signed and sealed properly.
3. Bank Guarantee is verified from issuing Bank.
4. Insurance policies, labour licence, performance guarantee are taken as per contract.
5. Technical personnel are deployed as per contract.
6. Plant and equipment are deployed as per contract.
7. Action for levy of liquidated damages is taken in case of delay/ default.

(b) Payments to contractors.

1. Price escalation is paid only as per contract.
2. Retention Money/ Security Deposit is deducted as per contract.
3. Recovery of Mobilization & Equipment advance is made as per the provisions in the contract.
4. Recovery of I. Tax & Works Contract tax is made as per provisions in the contract.
5. Glaring deviations are supported with adequate justification and are not advantageous to the contractor.

(c) Site Records

1. Proper system of recording and compliance of the instructions issued to the contractors is maintained.
2. Proper record of hindrances is maintained for the purpose of timely removal of the hindrance and action for levy of liquidated damages.
3. Mandatory tests are carried out as per the frequency prescribed in the Agreement.

42. THE CHIEF TECHNICAL EXAMINERS' ORGANIZATION (CTEO)

The Chief Technical Examiners' Organization (CTEO) in the Central Vigilance Commission is the technical wing of the Commission and it assists the latter in formulating its advice involving different technical /contract matters.

CVC has been laying stress on Preventive Vigilance and in pursuance of this objective; CTE's Organization emphasized creating awareness for Quality Control, Economy and adherence to rules and procedures. CTE's Organization has been functioning more like a vigilance audit wing where serious irregularities/lapses noticed during the inspections were sent for detailed investigations to the concerned Organization. It helps to improve the system in the organizations so that a recurrence of lapses /irregularities is prevented in the contracts and there is better technical and financial control that results in efficiency and transparency outcomes.

The wing comprises of two Chief Technical Examiners (of the rank of Chief Engineer) which are assisted by eight Technical Examiners (of the rank of Executive Engineer), six Assistant Technical Examiners (of the rank of Assistant Engineer) and other subordinate staff.

a) Submission of Quarterly Progress Report (QPR) to Commission

Every Unit and Zone has to submit the quarterly progress report to Chief Vigilance Officer in hard and soft copy by 10th day of the month following the quarter positively.

Separate reports have to be submitted for Civil Works (costing Rs one crore and above); Electrical Works (Costing Rs thirty lakhs and above); Horticulture Works (Costing Rs.2 lacs)and Store purchases contracts (Costing above Rs. two crores) .Mechanical (including air-conditioning) are treated as Electrical Works for the purpose of reporting to CTE's Organization. Store purchases contracts above Rs. two crores should also be intimated separately.

All works in progress, contracts awarded and the works completed during quarter should be included in the QPRs.

It has been noticed that some Units are either not submitting the QPR at all or incomplete shape. Non submission of the QPR may be treated as suppression of facts. Therefore, it is enjoined upon all the concerned Officers to arrange for the submission of QPR duly completed.

Statement showing the Quarterly Progress of Original Works for Quarter ending March/June /September/December

Civil Works costing Rs. One crore and above
 Electrical Works costing Rs. Thirty lakhs and above
 Horticulture Works costing Rs. Two lakhs and above

S. No	Name of work and location	Estimated cost	Tendered cost	% Margin to Org.	Agreement no.	Agency	Date of start	Time of comp.	Physical Progress	Name of E-in-c with address	Remarks
1	2	3	4	5	6	7	8	9	10	11	12

b) Common deficiencies observed in QPRs

Central Vigilance Commission, New Delhi has observed following deficiencies in quarterly progress report which is required to be taken care of while sending the Quarterly Progress Report.

1. Estimated cost/ tendered value of work is not being indicated in lacs uniformly. For some works in the same QPR, Estimated cost/Tendered Value is being indicated in Rupees, Lacs and Crores which creates confusion.
2. In case the work in progress is less than the prescribed value, only two highest value works are to be reported.
3. Clear name of works including locations is not being provided in a number of cases.
4. Full designation and location of the Engineer in charge is not being indicated in the QPRs.
5. Date of start and date of completion are not being indicated in dd-mm-yy format, rather unwanted information such as number of days allowed to the agency to start the work after issue of LOI etc. are being given.
6. Against the requirement of indicating the physical progress of the work in % terms, the quantities of various items of work are being given, which are not required.
7. The required certificate from the Zonal Manager that all the qualifying works have been reported is not being given in the QPRs.

(For further details:-CVC O.M. No. 98VGL 25 dated 28.05.2009 on "Common deficiencies observed in QPRs as noted by CTE")

c) Conduction of Independent Technical Examination of Works

One of the important functions of the CTEO is to conduct an independent technical examination of Civil, Electrical Works including Air-conditioning, Horticulture Works and Store Purchase Contracts, reported by the CVOs. Such examination /inspections lead to introducing number of systematic improvements and other remedial measures which help to prevent recurrence of such instances. It also has resulted in modifications in the procedure to bring about more transparency.

d) Collection of Data prior to Inspection

The Chief Technical Examiners' Organization (CTEO) requests CVOs to arrange to collect and make the following documents mentioned at Annexure I and II available to Chief Technical Examiner/ Technical Examiner/ Asstt. Technical Examiner to enable the inspection to be carried out properly as mentioned below:-

1. General Information in Annexure -I :- Proforma at Annexure I for items under paras 1 to 1.3 are required to be filled in and returned immediately duly signed. In case administrative set up is different in the organization than that indicated in paras 1.2 and 1.3, the same may be incorporated accordingly.

2. Technical Information in Annexure II: The proforma at Annexure II is to be filled in, signed and forwarded immediately along with copies against item No. 2,7,8,9 & 17.

The information in proforma at Annexure I & II is to be furnished on factual basis as per record already available. It is to be ensured that the requisite information is forwarded immediately so as to reach the office of CTEO within 15 days after issue of the letter. If one or two items are not readily available, the entire information may not be delayed and may be sent immediately. The remaining may follow shortly afterwards.

e) **Documents for inspection at site office -Annexure III:**

All the original documents as mentioned in annexure III are examined at site/site office and may be kept ready after inspection programme is intimated.

After intimation of the inspection programme, arrangements are to be made at site for the inspection of different works along with the required tools, plants and workmen. It has to be ensured that all parts of the building work are made available for inspection.

The inspection reports are forwarded by CTEO to the concerned CVO or the CBI for conducting detailed investigation from vigilance angle, if required, on the basis of the seriousness of the lapses/irregularities noticed during the inspection process.

Annexure-1

1.0 Particulars of Work

1.1 Name of Work

Agreement No

Name of Contractor

Estimated cost

Tendered cost

Date of start

Due date of completion

Present progress

1.2 Departmental Authorities

Zone/GM Office

Circle/Dy, GM Office

Division/Sr. Manager Office

Sub Division/Field Unit

1.3 Official- in-charge of Work

Chief Engineer/GM/ED

Superintending Engineer/Dy. GM

Executive Engineer/Mgr/Sr. Mgr

Asstt. Engineer / Dy. Mgr / Asstt. Mgr

Jr Engineer/Supervisor

Divisional Accountant/Finance Officer

Asstt. Surveyor of Work in Division/

Planning Officer in Field Unit

Surveyor of Work in Circle/Planning

Officer in GM/ED Office

Surveyor of Works in SSW's Office/

Planning Officers in Corporate Office

Name

Signatures

Technical Information

1. Name of work
2. Agreement Number (Please supply copy of Agreement)
3. Name of contractor
4. Estimated cost
5. Tendered cost
6. a) Date of commencement
b) Stipulated date of completion
c) % progress
7. Ref. Memo and date of sanction of Project (Please supply copy of memo.)
8. Ref and date of technical sanction (Please supply copy of Sanction)
9. Date of approval of NIT (Please supply copy of letter of approval)
10. Date of publication of NIT in press
11. Date of receipt of tenders
12. No. of tenders sold
13. No. of tenders received
14. Whether work awarded to lowest tenderer
15. Whether market rate justification available on record
16. Works manual adopted
17. S. No. and date of last bill paid (Please supply copy of bill with enclosures)
18. Whether AHR/LHR items identified
19. **No of items** **Extra items** **Substituted items** **Deduction items**
Sanctioned
Proposed
20. **Test check carried out up to last bill** **Prescribed** **Actual**
 % Test check by AE / Dy. Mgr /Asstt. Mgr

 % Test check by EE/ Sr. Mgr

 % Test check by SE/Dy. GM
 Name

Signatures

Annexure-III

Documents for Inspection at Site Office

- 1 a) Press cuttings including extended dates, if any
 - i) For pre-qualifications of Architects/Consultants
 - ii) For pre-qualifications of Contractors
 - iii) Call of tenders
- b) Register of sale of tenders
- c) Register of opening of tenders
2. File giving reference to final sanction and approval of competent administrative authority- Preliminary Estimate
3. Copy of detailed estimate and its Technical Sanction by competent technical authority
4. Approval of NIT (Notice inviting tenders) in original
5. Rejected tenders and comparative statements for
 - a) Selection of Architects/Consultants
 - b) Short listing of pre-qualifications of tender
 - c) Other tenders
6. Justification statement and corresponding noting in support of tenders/offers accepted
7. Details of negotiations ,if any ,made before acceptance of tender
8. Original contract with Consultant /Contractor
9. Guarantee Bond etc. towards security for work machinery/mobilization advance etc. including extension of validity
10. Insurance policy for work , materials equipment ,men etc. including extension of validity
11. Guarantee for water tightness ,termite proofing etc
12. Standard specifications
13. Standard schedule of rates
14. Drawings-Architectural, Structural, and Services
15. All connected measurement books, level books and lead charts.
16. All running account bills with all connected statements/ vouchers
17. Statement showing details of check of measurements by superior officers-

- Copies of order laying down such requirements.
18. Materials of site accounts/cement, steel, bitumen, paints, water proofing compound, pig lead, anti termite chemicals etc.
 19. Site order book/test records/log books.
 20. Details of extra/ substituted items and of deviated quantities being .executed/ considered for execution in the work along with analysis of rates.
 21. Hindrance register
 22. Office, correspondence files and inspection notes, if any, issued by inspecting officer
 23. Complaint records, if any
 24. Any other document related to the work
 25. Details of payments in **Proforma 'A'**
 26. Cement consumption statement in **Proforma 'B'**
 27. Steel consumption statement in **Proforma 'C'**
 28. Statement of tests of Materials in **Proforma 'D'**

Proforma 'A'

DETAILS OF PAYMENTS

S.No. of bill	CR No. Date	Account Payable				Total	Cheque amount	Details of disbursement and recoveries				
		On A/c Payment	Adv. Payment	Secured Advance	Mobilis-ation Advance			Adv. I/Tax	Cost of Mat.	Secured adv.	Mob . adv	Depo-sit

Name

Signatures

Proforma B

CEMENT CONSUMPTION STATEMENT FOR LAST BILL PAID (S. NO.)

Last date of measurements	Theoretically required	Actually consumed	Recovered	Remarks

Name

Signatures

Proforma 'C'

DETAILS OF STEEL REINFORCEMENT FOR LAST (S. No.) BILL PAID

Tor Steel dia in mm	8	10	12	16	20	22	25	28	32	36	40	42
Qty. issued by Deptt (MT)												
Qty. measured for payment MT)												
Qty. recovered from bill (MT)												

Notes:-

1. If Mild steel reinforcement is used, information may be furnished in same proforma as for Tor steel.
2. If Structural steel is used, information may be furnished in similar proforma for various sections instead of various diameters.

Name

Signatures

STATEMENT OF TESTS OF MATERIALS

S. No.	Disc. of Mats.	Qty. consumed till date	Disc. of tests as per BIS/ Agree. provn.	Freq. of tests as per BIS/ Agree. provn.	No. of Tests		Lab where test is conducted	Whether lab is appd. by Govt.	Status of Test results (pass)/ fail	If failed what action taken	Whether testing charges borne by Deptt./ Agency (Ref. To Agree.)	Recovery proposed for shortfall in tests/ failed results
					Reqd.	Conducted						
1	2	3	4	5	6	7	8	9	10	11	12	13

Engineer- in - charge

Chief Vigilance Officer

f) Recoveries arising out of intensive examination conducted by CTEO organization

The observation/ advice by the Commission are required to be considered by the executing agencies in terms of the contract and recoveries are to be enforced as admissible as per the conditions of the contract as the contracts are primarily between the executing agency and the contractor. Any endorsement that the recoveries are being made at the instance of the third party would weaken the department's case during arbitration or court proceedings.

Commission advises that justification/reasons for recoveries in line with the contract clauses should be recorded while notifying / effecting recoveries from the contractors.

(For further details:-CVC Circular No. 11/09/11 dated 12.09.2011 on " Recoveries arising out of intensive examination conducted by Chief Technical Examiner Organisation (CTEO) of the commission.

43. SUBMISSION OF ANNUAL PROPERTY RETURN

Every employee holding a post included in Group A & Group B is required to submit annual returns in the prescribed Performa in respect of the immovable property inherited by him or owned or acquired by him or held by him on lease or mortgage either in his own name or in the name of any member of his family or in the name of any other person as on 31st December. Please make sure that the said return should reach to the Vigilance Division latest by 31st Jan of the succeeding year. The following points may be taken care of while filling the APR:

Note I If the Property is not wholly owned the extent of share may also be indicated.

Note II For purpose of Col. 6, the term 'lease' would mean a lease of immovable property from year to year or for any term exceeding one year of reserve yearly rent. When, however, the lease of immovable property is obtained from a person having official dealings with the employee, such a lease should in this column irrespective of the term of the lease whether it is short / long term & the periodically of the payment of rent.

Note III In col. 4 should be shown:

- a) Where the property has been acquired by purchase, mortgage or lease, the price or premium paid for each acquisition.
- b) Where it has been acquired by lease the total annual rent thereof also and
- c) Where it has been acquired is by inheritance, or exchange the approximate value of the property so acquired.

Note IV The annual immovable property return is to be submitted as on 31st December and should reach by 31st Jan of the succeeding month.

Note V Name of District, Division, Taluka & Village in which the property is situated and also its distinctive number etc. be given in Col.1.

Note VI Whether by purchase, mortgage, lease inheritance, gift or otherwise & name with details of person/ persons from whom acquired. Address & connection, if any, with the person/ persons concerned, should also to be given in column.

STATEMENT SHOWING OF IMMOVEABLE PROPERTY AS ON 31st DECEMBER

1. Name of the Officer : _____
 2. Office/Unit of NPCC Ltd : _____
 3. Present post held : _____

4. Present Pay & Scale of Pay : _____
 5. If on deputation : _____
 i) Name of the parent department: _____
 ii) Post held in the parent department: _____

Name of district/sub divn. /Taluk and village in which property is situated	Name and details of property		Present Value	If not in own name state in whose name held and his/her relation to the employee	How acquired whether by purchases, lease, mortgage inheritance, gift or otherwise with date of acquisition and name with details of persons from whom acquired.	Annual income from the property	Source of Finance Amount Source	Whether sold if details			Remarks
	Housing and other building	Lands						Dt.	Amt.	To	
1	2	3	4	5	6	7	8	9	10	11	12

31 दिसम्बर 20 को अचल सम्पत्ति का विवरण

1. अधिकारी का नाम
2. एन.पी.सी.सी. कार्यालय/यूनिट का नाम
3. वर्तमान पद
4. वर्तमान वेतन तथा वेतनमान
5. यदि प्रतिनियुक्ति पर हैं तो :-
 - क) मूल विभाग का नाम
 - ख) मूल विभाग में पद का नाम

उस जिले/सब डिवीजन/तालुक एवं गांव का नाम जहाँ सम्पत्ति है	सम्पत्ति का नाम तथा विवरण	वर्तमान कीमत	यदि अपने नाम नहीं है तो किसके नाम पर है तथा कर्मचारी से उनका सम्बन्ध	किस तरह प्राप्त की-खरीद लीज, बंधक, खानदानी, उपहार या अन्य किसी प्रकार से । प्राप्त करने की तारीख तथा जिनसे प्राप्त की उनका नाम और विवरण	सम्पत्ति से वार्षिक आय	वित्तीय स्रोत प्रत्येक स्रोत से प्राप्त रकम	क्या बेच दी, यदि हां, तो विवरण			टिप्पणी
							तिथि	रकम	किसको बेची	
	आवासीय और अन्य भवन भूमि									

44. TRANSPARENCY IN TENDERING SYSTEM FOR COMPLEX NATURE PROCUREMENT

Where the equipments/ plant to be procured is of complex nature, the C V C advises that two stages tendering process may be preferred. During the first stage, it would be prudent to invite expression of interest giving the broad objectives, constraints etc from the leading experienced and knowledgeable manufactures/ suppliers in the field of the proposed procurement and the technical discussion/ presentations may be held with the short-listed manufactures/ suppliers. During these technical discussions stage, other stake holders in the discussions who could add value to the decision making on the various technical aspects and evaluation criteria may be called. Thus based on technical discussion/ presentation with the experienced manufactures/ suppliers specifications are to be finalized in a transparent manner laying down detailed technical specifications for each acceptable technical solution, quality bench marks, warranty requirements, delivery milestone consistent with the objectives of the transparent procurement. Care should also be taken to make the specification generic in nature so as to provide equitable opportunities to the prospective bidders & proper record of discussions/ presentations and the process of decision making should be kept.

On finalization of technical specifications and evaluation criteria, the second stage of tendering could consist of calling for techno commercial bids as per the usual tendering system under single bid or two bid system, as per the requirement of each case. Final selection at this stage would depend upon the quoted financial bids and the evaluation matrix decided upon.

Central Vigilance Commission desires that organizations formulate specific guidelines and circulate the same to all concerned before going ahead with such procurements.

(For details: - CVC Circular No. 01/02/11 dated 1st February 2011)

45. QUALITY MANAGEMENT SYSTEM

A quality management system provides a framework for satisfying the needs of all interested parties, continual enhancement of customer satisfaction and the satisfaction of all other interested parties and provides a confidence to the customers that they will be provided products and services that consistently fulfill their requirement.

46. ISO 9000 QUALITY SYSTEM

ISO 9000 is a series of five individual but related international standards for 'Quality Management and Quality Assurance Systems'. These standards were first published in the year 1987, revised in 1994 and re-revised in 2000. These standards apply to all types of organizations-engineering, service, software, process industries. These standards are not specific to any particular product and can be used by manufacturing and service industries alike. ISO 9000 standards guide to establish, operate, document and maintain an effective, economic quality system which demonstrates the customers that the supplier's organization is committed to quality and capable of meeting the specified quality standards.

ISO 9000 series consists of (a) Three main Quality System documents, which are models of quality assurance namely ISO 9001, ISO 9002 and ISO 9003 and (b) Two supporting Guidelines Standards namely ISO 9000 and ISO 9004, which provide guidelines on selection, use, development and implementation of Quality (Management) System in an organization. In addition, ISO 8402 (IS 13999) is a supplementary document which defines the terms used in the series, for mutual understanding and international communication.

ISO 9000-2000: Quality Management and Quality Assurance Standards-Guidelines for selection and use. (IS 14000)

ISO 9001-2000: Quality Systems –Model for Quality Assurance in Design/ Development/ Production, Installation and Servicing (IS 14001).

ISO 9002-2000: Quality Systems –Model for Quality Assurance in Production and Installation. (IS 14002)

ISO 9003-2000: Quality Systems –Model for Quality Assurance in final Inspection and Test. (IS 14003)

ISO 9004-2000: Quality Management and Quality System Elements -Guidelines for Performance Improvement. (IS 14004)

a) ISO 9001- Quality Management Standard

ISO 9001-2000 is one of the standards in the ISO 9000 family and is the sole standard for certification purpose.

ISO 9001 is the internationally recognized standard for the quality management of businesses, ISO 9001 applies to the processes that create and control the products and services of an organization. It prescribes systematic control of activities to ensure that the needs and expectations of customers are met. It is designed and intended to apply to virtually any product or service, made by any process anywhere in the world.

b) Benefits of implementing ISO 9001

Implementing a Quality Management System motivate staff by defining their key roles and responsibilities. Improved efficiency and productivity helps in cost savings. Improvements can thus be implemented resulting in less waste, inappropriate or rejected work and fewer complaints. Customers will notice that orders are met consistently on time and to the correct specifications which increased opportunities for the Organization.

ISO 9001:2000 certification shows commitment to quality, customers and a willingness to work towards improving efficiency. It demonstrates the existence of an effective quality management system that satisfies the rigours of an independent, external audit.

ISO 9001 certification enhances company image in the eyes of customers, employees and shareholders alike. It also gives a competitive edge to an organization's marketing.

c) ISO 9001-2008

ISO 9001: 2008 has been developed to introduce clarifications to the existing requirements of ISO 9001: 2000 and to improve compatibility with ISO 14001: 2004. It does not introduce additional requirements nor does it change the intent of the ISO 9001:2000 standard. ISO 9001:2008 will have minimal or no impact on the documentation.

Certification to ISO 9001:2008 is not an upgrade and organization that are certified to ISO 9001 : 2000 will be afforded the same status as those who have already received a new certification to ISO 9001:2008. However, in order to benefit from the clarifications of ISO 9001: 2008,users of ISO 9001: 2000 will need to take into consideration whether the clarifications introduced have an impact on their current interpretation of ISO 9001: 2000, as changes may be necessary to their QMS (Quality Management System).

ISO 9001:2008 allows organization flexibility in the way it chooses to document its quality management system (QMS).The enables each individual organization to develop the minimum amount of documentation needed in order to demonstrate the effective planning, operation and control of its processes and the implementation and continual improvement of the effectiveness of its QMS.

The major benefits of using the revised standard ISO 9001 :2008 is that it is simple to use, clear in language , readily translatable , easily understandable and compatible with another management systems such as ISO 14001.

47. QUALITY MANAGEMENT PRINCIPLES

ISO/TC176, has drafted the ISO 9001:2000 standard. It defines a quality management principle as a comprehensive and fundamental rule or belief, for leading and operating an organization, aimed at continually improving performance over the long terms by focusing on customers while addressing the needs of all other interested parties.

International Organization for Standardization (ISO) has adopted the eight universally accepted quality management principles to serve as the foundation for all the requirements of ISO 9001: 2000 standard. All the requirement of ISO 9001:2000 are related to one or more of these principles given below:

1. **Customers Focus** Organization depend on their customers and therefore should understand current and future customer needs, meet customer requirements and thrive to exceed customer expectations.
2. **Leadership** Leaders establish unity of purpose and direction for the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.

3. **Involvement of People.** People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefits.
4. **Process Approach.** A desired result is achieved more efficiently when related resources and activities are managed as a process.
5. **System Approach to Management.** Identifying, understanding and managing interrelated process as a system contributes to the organization's effectiveness and efficiency in achieving its objectives.
6. **Continual Improvement.** Continual improvement of the organization's overall performance should be a permanent objective of the organization.
7. **Factual Approach to Decision Making.** Effective decisions are based on the analysis of data and information.
8. **Mutually Beneficial Supplier Relationship.** An organization and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value.

48. **TOTAL COST MANAGEMENT (TCM)**

TCM is a systematic approach to managing cost throughout the life cycle of any enterprise, program, facility, project, product, or service.

Application

TCM Framework process is based on broadly accepted "first principles i.e. PDCA management or control cycle, which is also known as the Deming or Shewhart cycle. The PDCA cycle is a generally accepted, quality driven, continuous improvement management model. The PDCA cycle in TCM includes the following steps:

Plan: Depending upon the requirement planning for asset solutions or project activities.

Do : Based on the plan, initiating and performing the project or project activities in accordance with the plan for execution.

Check: Whether the execution is in accordance with the plant and accordingly making measurements of assets, project, or activity performance.

Assess: After execution, assessing the performance variances from the plant and taking action to correct or improve performance to bring them in line with the plant or to improve the plan.

Any improvement can be understood only if there is measurement involved. TCM believes in this statement "If one cannot measure it, one cannot manage it". Thus Measurement is a key element of the PDCA process cycle which is often lacking in other management systems that focus on planning.

Therefore one needs to set goals which should be fixed for critical business parameters on which success depends. The goals should be SMART- i.e.

Specific, Measurable, Achievable, Realistic and Time bound.

One should measure both efficiency (how well one is doing) and effectiveness (doing right things or not). The non-financial factors like Productivity (Output for given inputs), Utilization (Use of resources), Speed and Quality make up other set of information which provide relevance to decision making.

Importance of life cycle costing

Every product or project or asset presumes to have a beginning and an end. For an asset, the life cycle is described as the existence an asset from the stages of ideation to termination and for a project the life cycle is described.

Project life cycle

The life cycle of a project can be summarized in four sequential phases.

1. Ideation: Ideation given overall requirements of the project, the project team assesses alternative concepts for performing the project and selects an optimal performance strategy. Strategic performance requirement for the project are established.
2. Planning: Project plans are developed that address the strategic requirement and selected performance strategy.
3. Execution: The plans are implemented through the execution of planned project activities.
4. Closure: The asset or deliverables is reviewed, tested, verified, validated, and turned over to the customer. Learnings for future use in ideation are documented.

PDCA cycle is required to be continually improved due to changing conditions and if does not return to its original state. The plan-do-check-assess process is employed continually to achieve various milestones or deliverables at each phase of the project life cycle.

Organization of the TCM framework

TCM is a quality driven process model. TCM framework uses process management conventions consisting of flow of inputs and outputs with mechanisms that transform the inputs to outputs. The intermediate transforming mechanisms or activities are referred to as tools, techniques, or sub-processes.

Benefits of TCM

TCM prompts the Management to ask the following questions and then provides the right answers:

Which are the profitable customer segments? What are their product cost and their profitability? How well informed are sourcing decision? Do the costs go up

despite cost cutting efforts? Can price be reduce and yet increase customer value?

In an ever increasing competitive environment; inefficiency of one firm is becoming an opportunity for the other. Achieving both sustainable competitive advantage and performance excellence is critical in the current business environment. A company adopting TCM approach can not only benefit sustainable competitive advantage but can also break its own performance records. TCM focuses on spirit of improvement.

A cost escalation is a common phenomenon rather than an exception. The application of TCM and practices enhances the competitiveness in cost, quality and timely services and for creating breakthrough achievements with unparallel excellence.

TCM is a systematic way of looking at projects in order to sustain growth and maintain profitability by optimizing resource utilization. It provides a scientific approach and enables the organizations to look at problems objectively and solve them. Thus it becomes necessary and relevant tool to meet the challenges thrown by the external environment and competitions.

49. SIX- SIGMA

Six sigma is a highly disciplined process that helps to focus on developing and delivering near product and services. It is a methodology used to eliminate defects and to determine the performance of the process. A defect is anything that is outside or against the customer requirements. A process should not produce defects more than 3.4 per million opportunities to achieve Six Sigma Quality.

There are two methods of following the Six Sigma Methodologies as follows:

a) **DMAIC**. This methodology is used to bring about the improvement in the existent process and products and bringing in improvement in them. It consists of five interlinked process steps viz. **D**efine; **M**easure, **A**nalyze, **I**mprove and **C**ontrol.

b) **DMADV**. This methodology is used to create new products and design new processes. The objective of this methodology is to create designs which are predictable and do not have any defects. It consists of five interlinked process steps viz. **D**efine; **M**easure, **A**nalyze, **D**esign and **V**erify.

The basics of Six Sigma explains about the variation and defects in a project which is considered as the obstacle in a project to attain the quality product and the ways to find it and eliminate them.

Six Sigma is a well defined approach in problem solving which focus on customer requirements and the impact on it. Statistical tools and analysis are used to develop a usual process. Six Sigma is being used in different fields such as production, business, medicine, administration, engineering product designing, manufacturing, quality management etc.

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