Quality Inspection Report

Volume - (I)

March 2013

Final Report

for Central Government
Employees Welfare
Housing Organisation (CGEWHO)

by Housing & Urban
Development Corporation Ltd.,
Consultancy Wing , Chennai

Index

Executive summary

Central Government Employees Welfare Housing Organization (CGEWHO) has recently completed Kendriya Vihar II Housing Scheme consisting of 572 Dwelling Units at Paruthipatu, Chennai. Certain customers who are allottees of dwelling units of the said project have made complaints of defects in the quality of work. CGEWHO awarded the work of quality audit / inspection to HUDCO.

The scope of work included a)adherence to specifications provided in the contract documents as well as amendments made from time to time by CGEWHO and b)Visual inspection of all flats / common amenities and development works and present a summarised report on the work executed.

The quality audit of the Kendriya Vihar Phase II by CGEWHO was carried out in 3 stages. As a precursor, the allottees and CGEWHO were given time till 20.09.2012 to compile and provide a final listing of complaints and responses thereto, respectively. Based on this input, a data capture sheet was devised with 376 parameters for each flat to be inspected.

As a first stage, data generated from visual inspection of general aspects of all the flats with reference to 376 parameters were tabulated and computerized and the analyses charted out digitally. However out of the 572 flats only 471 flats could be inspected as the allottees of the remaining flats failed to unlock them for inspection despite many communications, reminders and close coordination. Similarly, visual inspection of general aspects of common areas, amenities and external surfaces of building blocks was carried out for all the 37 blocks.

As a second stage, adherence to the brands and specifications stated in the tender document was verified with

a) The tender document

b) Specific complaints from allottees with respect to brands and specifications and response thereto from CGEWHO

c) Visual inspection and

d) A few sample invoices submitted by CGEWHO in respect of those items in which complaints have been received from the allottees

This was done for 16 flats covering various housing types and levels of location.

And finally as third stage, a similar visual inspection of specific aspects was carried out for the common areas in the blocks and also the development works and the results tabulated.

Broadly the occurrences of defects in respect of the flats are as follows:

Defects (Number of flats with defects)			
S No	**Core Components**	**Number of Flats with defects***	**As a % of total number of flats inspected**
1	**Civil**		
1a	**Column, Beam Lintel**	145	30
1b	**Flooring, Walls, Ceiling, Loft, Cupboard and Platform**	389	82
1c	**Doors & Windows**	393	83
1d	**Toilets**	214	45
2	**Plumbing & Sanitation Works**	268	56
3	**Electrical Works**	105	22
* For example, if the floor tiles are defective in three rooms in the same flat, then 'number of flats with defects' is reported as one.			

The deficiencies range from partial fixing of hinges to skewed walls and columns.

- In respect of the adherence to tendered specifications all relevant clauses were analysed and some of them were found to be not conforming to the tender schedule. Some of the significant non-conformities are:
    a. Precast RCC/CC Frames have been used instead of Pressed steel single rebated frames
    b. Deviation from prescribed heights in respect of electrical fittings
    c. PVC cistern instead of chinaware cistern.
- in respect of the common areas, the following were areas which were incongruous:

a. Stilt areas: poor alignment of columns and inadequate car parking are the main incongruities along with lack of level difference between some parking space and adjacent roads.
b. Staircases: non-uniform risers, rough finishing in respect of handrails, stair walls and dampness.
c. External surfaces of blocks: poor anchorage and alignment of drain pipes and poor plastering and finishing.
d. Terrace/roof top: undulations, damaged water proofing, expansion/construction joints not sealed, overflow pipes from overhead water tanks not connected to drain pipes, height of parapet walls ranging between 68 and 74 centimeters.

- Development works
  a. Roads: non-provision of camber, undulation in the paved surface and wearing of the seal coat.
  b. Storm water drainage: inadequate slope and improper termination of rain water pipes and inadequate open section of drains.
  c. Sewerage: Part of the sewage being discharged in to nearby open area without any treatment.
- Product Make check

  Most products used were of approved specification either approved in the tender or in a subsequent amendment (*as indicated in CGEWHO letter dated vide letter 28th September 2012 and 21st January 2013*). Some of the non-conformities are as follows:

  - Instead of CP brass, PVC pipe has been provided for cistern connection.
  - Instead of white vitreous chinaware, PVC cistern has been provided.

Remarks/conclusion:

CGEWHO was carrying out some rectification works which were noticed during the inspection. While many of the defects noticed are rectifiable, some of them

namely skewed and improperly aligned columns or walls out of plumb are hard to remedy. The overall finish appeared to be reasonable keeping view the cost and time taken to complete the project .as far as the time overrun is concerned it is pertinent to point out that the work was awarded in June 2006 and is yet to be fully complete. Savings on account of time alone would have enabled the agency to achieve better quality

A draft report was shared with CGEWHO and their reply is attached at the end of this Volume. This report has been finalized incorporating modifications at 9 places. A schedule of modifications along with comments from CGEWHO is attached at the end of this Volume.

1 Preamble

1.1 Consultancy Assignment

Central Government Employees Welfare Housing Organization (CGEWHO) is an autonomous body of Government of India, under Ministry of Housing and Urban Poverty Alleviation. CGEWHO executes housing complexes on ownership basis specifically for Central government Employees all over the country through various self financing schemes on "No profit and No loss" basis as a welfare measure. CGEWHO has recently completed Kendriya Vihar II Housing Scheme consisting of 572 Dwelling Units at Paruthipatu, Chennai.

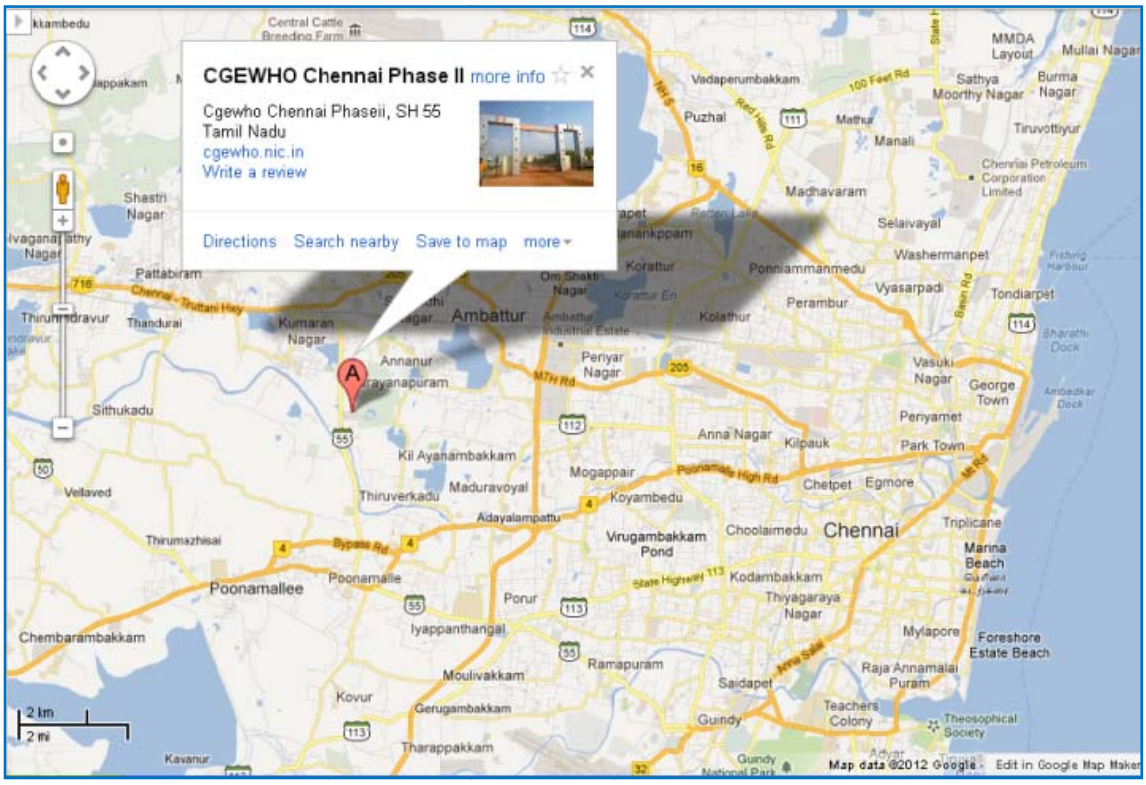
Certain customers who are allottees of dwelling units of the said project have made complaints of defects in the quality of work, due to which CGEWHO approached the Housing and Urban Development Corporation Limited (HUDCO) to carryout **3rd Party Quality Inspection / Audit.** HUDCO has accepted the request and provided consultancy service for the same.

1.2 Project - Kendriya Vihar (PII)

The residential complex is located at Paruthipatu, abutting Poonamallee-Avadi Road (SH-55), Avadi, Chennai. It is executed on approximately 11 acres out of the total 26.52 acres of land. Balance land is reserved for Phase III development.

The project comprises of 572 dwelling units (DU) and it is grouped in 37 blocks of 4 types of dwelling units viz., A, B, C & D. The type-wise detail is as follows. The buildings are designed as RCC framed structures.

Type of DU	Configuration	No. of DUs	Area (Sft)
A	G+3	64	614
B	Stilt+4	248	1055
C	Stilt+4	180	1353
D	Stilt+4	80	1672



Satellite terrain maps showing the location and layout of Kendriya Vihar Phase II

Facilities and services available in the campus are:

- Each Block is provided with a lift and staircase.
- The complex is secured by compound wall and security block.

- Water is being provided by pumping from bore wells to sumps and thereafter to Over Head Tanks of individual blocks.
- Drinking water is supplied through a reverse osmosis (RO) plant to every kitchen of the DU's.
- Sewerage network of the complex is connected to sewage treatment plant (STP) and treated effluent is discharged to the garden.
- Strom water drain system is provided.
- Power back for common areas also is provided.

Other Project Information:

- The project development work was awarded on the basis of turnkey contract to M/s. Srico Projects (P) ltd., on 21.06.2007.
- Approval from Chennai Metropolitan Development Authority (CMDA) was obtained on 04.12.2006

- Completion Certificate from CMDA:
    - 27 block was obtained on 10.05.2012

  - Balance 10 blocks was obtained on 27.12.2012

- The Project Cost of Phase (II) is Rs. 62.54 Crores*.

1.3 Scope and Limitation

As a part of resolving complaints received from the customers, CGEWHO requested HUDCO to taken up an audit of the construction.

1.3.1 *Scope of Work*

1. To assess whether the works executed are as per the specifications provided in the contract documents as well as amendments made from time to time by CGEWHO.
2. Visual inspection of all flats / common amenities and development works and present a summarised report on the work executed.

1.3.2 *Limitations*

Comprehensive quality inspection/audit was not undertaken. The inspection and reporting is limited by:

1. Concealed items were not covered and inspection was limited to items of work, which were visible to the naked eye and also on 'as is where is' basis at the time of inspection.
2. Planning, architectural and engineering aspects of quality audit are limited to examination of complaints from beneficiaries in general and specific directions issued by CGEWHO within a cutoff date†.
3. Relevant documents and drawings made available within a cutoff date.
4. No recommendations or opinions are made through this report. Statuses are reported and inferences are drawn based on the circumstances and facts as existed at the time of inspection.

* as per the Project Brief submitted by CGEWHO

† **Cutoff date being 20.09.2012**

1.4 Disclaimer

HUDCO (Consultant) has exercised due care in conducting this quality inspection. This report captures defects/deficiencies assessed through visual inspection of visible parts of the project achieved through a process of sampling. This report is not intended to certify, express or implied, adequacy or inadequacy of the project or of its parts.

This inspection/ auditing is based on a sampling process of the available information and that consequently there will always be an element of uncertainty present in auditing evidence, which may be reflected in the audit findings. Those relying or acting upon the audit results and conclusions should be aware of this uncertainty.

This report is prepared at the request of Central Government Employees Welfare Housing Organization (CGEWHO), the client. No part of this report may be copied or duplicated without the express written permission of CGEWHO.

1.5 Structure of the Report

This 3rd Party Inspection/audit report is arranged in three volumes. An outline of the structure is given hereunder:

Volume (I) :

- Methodology,
- Selection of Inspection Parameters,
- Inspection Formats,
- Analysis and Inferences.

Volume (II) :

- Filled-up Formats for Visual inspection of General aspects
  - Individual Flats
  - Common area and Amenities
- Filled-up Formats for Visual inspection of Specific aspects

  Work Specification Check (Flats)

In DVD :

- Copy of Photographs

Volume (III) :

- Copies of important communications between HUDCO and CGEWHO
- Relevant Drawing and Documents received from CGEWHO.

2 Planning the Quality Audit Programme

2.1 Approach & Methodology

2.1.1 *Approach*

An initial survey/inspection was carried out to identify various aspects of construction which would need attention. Discussions were held with CGEWHO. Written complaints from the allottees and related responses from CGEWHO were obtained. Basic documents and drawings to achieve a broad understanding of the entire project were obtained from CGEWHO.

Based on all the above information, the need for conducting inspection in two, somewhat distinct, sets of parameters was established. They are: inspection of **General Aspects** and **Specific Aspects.**

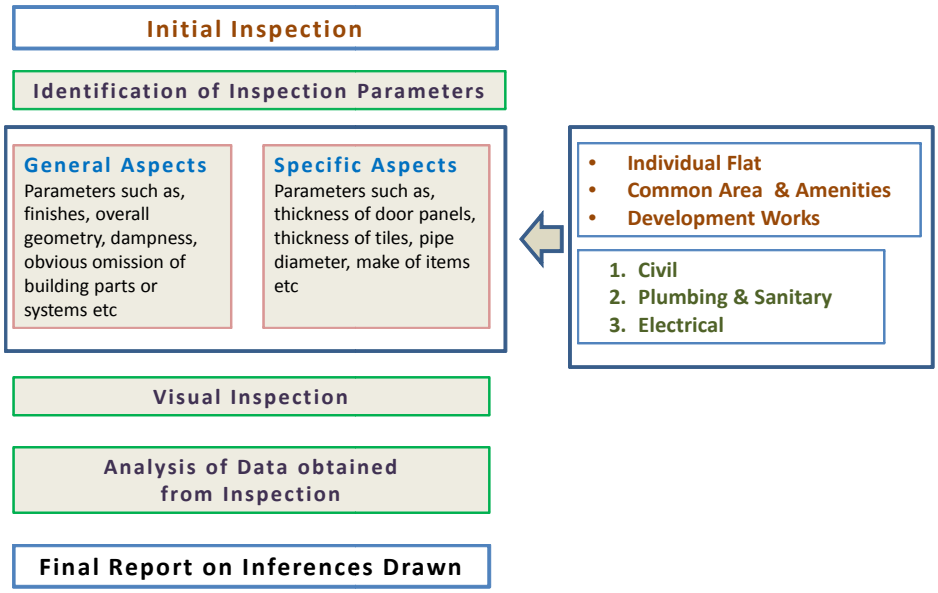
2.1.1.1 Visual inspection of General aspects

- Parameters such as, finishes, overall geometry, dampness, obvious omission of building parts or systems etc. are covered under General aspects.
- Considering the fact that most of the flat owners had made complaints, it was decided that inspection to cover General aspects should be done for all the dwelling units.

2.1.1.2 Visual Inspection of Specific Aspects:

- Parameters such as, thickness of door panels, thickness of tiles, pipe diameter, make of items etc. are covered under Specific aspects.
- These were planned to be evaluated on the basis of visual observations and basic measurements.
- As this is a much more intense process of evaluation, it was decided to go in for a representative sample.

2.1.2 *Methodology*



2.2 Sample Selection:

Upon analyzing the nature of complaints it was inferred that as many of the complaints were repetitive in nature it was decided to adopt the following sample sizes for General and Specific aspects for Visual Inspection

2.2.1 *General aspects*

1. Individual flats -100 %

   Large number of allottees had expressed varying levels of concern about defects in the quality of work executed and hence it was decided to inspect all the flats in the complex.
2. Common area and Amenities

   All the blocks
3. Development works

   All development works

2.2.2 *Specific aspects*

1. Individual flats

Random sample of four flats per category spread in all floors, totaling to 16 flats was chosen. The flats chosen are

i. A1-1, A2-21, A3-41, A4-62
ii. B15-219, B16-240, B13-194, B14-214
iii. C1-15, C10-140, C11-152, C12-175
iv. D1-16, D4-52, D5-69, D13-42

2. Common area and Amenities

   Common areas:

   Stilt Area, Staircase Area, Terrace, and External Wall for all the blocks

   Amenities

   Lift, Electrical and communications.

3. Development works

   A Sample of all development works were inspected.

3 Inspection Parameter

3.1 Parameters Considered for Inspection of General Aspects

3.1.1 *Individual Flats*

3.1.1.1 Civil works

Following four core parameters were considered for inspection of civil works

1. Column & Beams
2. Floor, Walls Ceiling, Loft Cupboard and Platform
3. Doors, Windows and Grills
4. Toilets

In order to capture data cogently the following were the list of individual parameters under each heads mentioned above. Keeping in view the number and range of complaints a total of 377 parameters as listed below were selected for inspection.

3.1.1.1.1 Column & Beam

Code	Component	Parameters inspected
A2a	Beam / Lintel	
		Beam above loft sloppy
		Beam not level
		Beam soffit to be finished
		Beam soffit undulated
		Beam undulating
		Door soffit not level
		Horizontal cracks at roof beam soffit
		Lobby opening soffit not level
		Reinforcement bar protruding from beam
A2b	Column	
		Column not in plumb
		Column skewed

3.1.1.1.2 Floor, Walls, Ceiling, Loft Cupboard and Platform

Code	Component	Parameters inspected
A1a	Floor Tiles	
		Door Sill not finished
		Door Sill to be finished
		Few tiles broken
		Floor tiles damaged
		Floor tiles joints not finished
		Floor tiles packing/seating not proper
		Flooring incomplete
		Flooring pattern not aligned to wall
		Flooring tile shade mismatch
		Flooring tiles uneven level
		Tiles laid unevenly
		Vertical tile at door sill not provided
A1b	Wall Tiles / Skirting Tiles	
		Gap in grill door
		Gaps in skirting tiles
		Pointing not done in wall tiles
		Skirting tile not provided
		Skirting tiles joints not finished
		Skirting tiles damaged
		Skirting tiles not finished
		Skirting top uneven/not finished
A1c	Flooring	
		Floor not level
		Flooring pattern not aligned to wall
A1d	Spout	
		Spout grouting not proper
		Spout improper
		Spout not provided.
A2c	Cracks in Wall	Crack in walls
		Cracks at lintel level
		Diagonal cracks near lintel/openings
		Horizontal cracks at roof beam soffit

Code	Component	Parameters inspected
A2d	Dampness in Wall	
		Dampness above skirting
		Dampness below sink
		Dampness below wash basin
		Dampness in beam
		Dampness in external wall
		Dampness in internal wall
		Dampness in wall
		Dampness in wall (Toilet)
		Rainwater seepage at window sill
		Rainwater seepage at window sills
A2e	Exhaust Fan Location / Shape	
		Exhaust fan location improper
		Exhaust hole improper
		Exhaust opening not finished
		Exhaust openings not in shape
A2f	Plastering, Painting and Finishing	
		Ceiling finishing incomplete
		Final coat of painting not done.
		Finishing above wall tiles not done
		Finishing incomplete in walls
		Finishing to be done near door frame
		Finishing work around ventilator not done properly.
		Finishing works not done in kitchen below beam.
		Loft top not finished
		Loft top not finished properly
		Patchwork in walls incomplete
		Patchwork to be painted
		Plaster patchwork to be repainted
		Plastering splash not scrubbed
		Wall finish rough
		Window jamb not finished
		Window sill not level
		Window sill to be finished
		Window sill to be painted
		Window soffit not level
A2g	Wall Alignment / Plumb	
		Supporting wall of platform skew
		Tiles damaged - near ventilator
		Wall not aligned
		Wall skewed
		Walls below platform not plumb
		Walls not in Plumb

Code	Component	Parameters inspected
A3a	Ceiling Alignment & levels	
		Ceiling above loft not level
		Ceiling not level
		Ceiling undulating
A3b	Dampness in Ceiling	
		Dampness in ceiling
		Seepage in ceiling
A3c	Crack in Ceiling	
		Crack in ceiling
A5a	Loft Level	
		Kitchen loft not level
		Loft beam not level (kitchen)
		Loft not level
		Loft not level and to be painted
		Loft space is too small.
		Loft thickness not uniform
		Loft top not finished
		Loft top not finished properly
A5b	Cupboard	
		Cupboard soffit not level
		Cupboard soffit to be finished
		Cupboard soffit undulating
		Cupboard platform to be finished
		Cupboard soffit finished with AC sheet - joints not finished/bent
		Cupboard top not level
		Dampness in cupboards
		Hinges not fixed properly
		Platform-cupboard to be finished
		Walls not in Plumb
A5c	Platform	
		Gap between kitchen slab and wall
		Platform below sink to be finished
		Platform edge not smooth
		platform not level
		Platform skew
		platform supporting walls skew
		Platform-cupboard to be finished
		Supporting platform wall not in plumb

3.1.1.1.3 Doors, Windows and Grills

Code	Component	Parameters inspected
A4a	Door Hardware	
		Aldrop holder fixed outside
		Aldrop holder to be provided
		Aldrop hole not provided
		Aldrop missing
		Aldrop not closing properly
		Aldrop not fixed properly
		Aldrop not painted
		Aldrop not provided
		Bush/buffer not fixed
		Door fixtures missing
		Door shutter fixtures missing
		Door stopper damaged
		Door stopper not fixed
		Door-fixtures missing
		Godrej lock not fixed
		Godrej lock not fixed properly/damaged
		Handle and tower bolt missing
		Handle not fixed properly
		Handle not provided
		Hinge damaged
		Hinge not fixed
		Hinges loosely fixed
		Hinges not fixed properly
		Less screws in hinges
		Name plate not provided
		Safety latch not provided
		Safety latch rusted
		Shutter damaged
		Tower bolt damaged
		Tower bolt not aligned
		Tower bolt not provided
		Tower bolts are not operatable
		Tower bolts not fitted properly
		Tower bolts not fixed
		View finder covered with paint
		View finder not fixed
A4b	Window Hardware	
		All glass pane shutter handles are hitting the grill
		Handle not provided
		Hinges not fixed properly
		Hooks not fixed properly
		Tower bolts not fitted properly
		Tower bolt broken/damaged

Code	Component	Parameters inspected
A4b	Window Hardware	Tower bolt not aligned
		Tower bolts not fixed
		Window handle missing
		Window hooks missing
		Window tower bolt damaged
		Backside of door frame - rough
		Cracks in Door frame
		Door frame damaged
		Door frame inclined
		Door frame joints to be finished
		Door frame not finished
		Door frame not painted
		Door frame painting incomplete
		Door frame putty work not finished properly.
		Extra Holes on frame not filled
		Frame damaged
		Frame improper vertical alignment
		Frame not horizontal
		Frame rear side not finished
		Gap between frame and wall
		Gap in frames
A4d	Door Shutter	Door painting incomplete
		Door shutter damaged
		Door shutter not closing
		Door shutter not fixed properly
		Door shutter not painted
		Door shutter not painted properly
		Door shutter not provided
		Final coat of painting not done.
		Gap between door shutter and frame
		Gap between shutter and flooring
		Gap in door shutter
		No lipping
		Shutter damaged
		Shutter not closing
		Shutter not closing properly
		Shutter not fixed
		Shutter side lipping damaged
		Shutter side lipping painting not done
		Shutter side to be painted
		Shutter sides to be finished
		Shutter/ frame is damaged

Code	Component	Parameters inspected
A4e	Window Grill & Mesh	
		Grill not fixed
		Grill not fixed properly/less screws
		Grill not painted
		Grill rusted
		Mesh damaged
		Mesh not fixed
		Mesh rusted
		Screws missing in grill
		Window grill not finished
		Window grill spacing uneven
		Window mesh shutter damaged
A4f	Window Shutter	
		Beading not proper
		Beading not provided
		Gap in frame and shutter
		Glass broken
		Glass not provided
		Glass pane broken
		Glass pane not fixed properly
		Glass shutter not closing
		Glass Shutter not fixed
		Glass shutter not fixed properly
		Shutter frame is damaged
		Shutter not closing
		Shutter not closing properly
		Shutter not fixed
A4g	Window Frame	
		Frame not horizontal
		Gap in frame and grill
		Gap in frame and shutter
		Gap in frames
		Window frame damaged.
		Window frame joints to be finished
		Window frame not finished
		Window frame not painted
		Window not fixed properly
A4h	Grill Door	
		Bolt protruding
		Door frame inclined
		Frame improper vertical alignment
		Grill door sagged
		Grill door aldrop holder fixed outside
		Grill door aldrop holder missing
		Grill door aldrop not closing
		Grill door bent
		Grill door rusted

Code	Component	Parameters inspected
		Grill not fixed
		Grill rusted
		Grill door obstructs staircase
		Mesh damaged
		Mesh not fixed
		Mesh not fixed properly
		Mesh rusted
		MS flats not fixed properly/missing
		Welding not proper
A4i	Ventilators	
		Glass louvers broken
		Glass louvers not in position
		Glass louvers not fixed
		Louvers not fixed properly
		Ventilator jamb not finished
		Ventilator jamb not finished/painted
		Ventilator mesh rusted
A5j	Railing	
		Railings to be painted

3.1.1.1.4 Toilets

Code	Component	Parameters inspected
B2a	Bathroom Floor Tiles	
		Few tiles broken
		Flooring damaged due to seepage
		Flooring incomplete
		Flooring tile shade mismatch
		Flooring Tiles not packed properly
		Flooring tiles uneven level
		Gaps in Tiles joints/partly not fixed
		Joint in wall tiles open
		Slope not proper
		Tiles damaged in W/C platform
		Tiles laid unevenly
		Vertical tile at door sill not provided
B2b	Bathroom Floor	
		Slope not maintained
B2c	Bathroom Wall Tile	
		Dado - few tiles broken
		Dado tile top not finished
		Dado tiles joints not finished properly
		Patchwork in walls incomplete
		Pointing not done in wall tiles
		Skirting tile not provided

Code	Component	Parameters inspected
		Skirting tiles not finished
		Tile cut out for electrical point to be closed
		Tile cut out for electrical power points not proper
		Tile cut outs for plumbing not proper
		Tile cutout for electrical fixtures not finished
		Tiles being re-laid
		Tiles top to be finished
		Wall tiles broken

3.1.1.2Plumbing & Sanitary Works

Code	Component	Parameters inspected
B1a	Plumbing Fixtures	
		All Fixtures rusted
		Bib cock improper
		Bib cock not fixed
		Bib cock rusted
		Bib cock slanting
		Bottle trap not fixed properly
		Cement packing not done for cistern pipe.
		Cistern damaged / not fixed
		Cistern damaged/not fixed properly
		Cistern joints to be finished
		Cistern missing
		Cistern not fixed
		Cistern not fixed properly
		Cistern pipe leaking
		Control valve broken
		Control valve knob missing
		Control Valve not fixed
		Control valve not fixed
		CP Grating for kitchen sink missing
		EWC connection not finished properly
		Grating damaged
		Grating location improper
		Grating not fixed
		Grating not provided
		Grating to be finished
		Long Bibcock not fixed
		Pipe and tap missing
		Pipe fittings missing
		Pipes missing
		Plumbing cutout not proper
		Plumbing fixtures not provided
		Plumbing fixtures rusted
		Plumbing joints to be finished
		Shower rose not fixed

Code	Component	Parameters inspected
		Sink drain assembly not fixed
		Sink rusted
		Tap not provided
		Toilet geyser connecting pipe missing
		Toilet geyser connecting pipe missing
		Towel ring rusted
		Towel rod not fixed
		Towel rod rusted
		W/C joints not finished properly
		Wash basin drain pipe not connected
		Wash basin not connected
		Wash basin not fixed
		Wash basin pipes rusted
		Washbasin angles not painted
		Waste pipe is leaking
		Waste pipe not fixed
		Water mixer position improper
		Water mixer to be connected
B1b	**Pipe**	Leakage in pipe fixtures
B1c	**Sanitary Fittings and Fixtures**	Cistern not connected
		Cistern pipe leaking
		Cistern pipe too long
		Floor trap not provided
		Floor trap to be finished
		Grating location improper
		Grating rusted
		IWC finish not proper
		Sanitary fittings missing
		W/C blocked
		W/C cracked / broken
		W/C damaged
		W/C foot rest broken
		W/C location not proper
		W/C not fixed
		WC cover missing
		WC joints not finished properly
		WC not finished
		WC pipe missing

3.1.1.3 Electrical Works

Code	Component	Parameters inspected
Ca	Electrical	
		15 Amp power point to be fitted
		AC point cover not provided
		Cable conduit box missing
		DB cover not fixed
		Dummies in Electrical DB provided less
		Electrical point openings to be filled
		Electrical box cover plate not fixed
		Electrical Conduits not properly concealed
		Electrical DB Box not fixed properly
		Electrical junction box cover not fixed properly
		Electrical opening to be closed
		Electrical point missing
		Electrical point to be finished
		Electrical power point holder not fixed
		Electrical switch board cover not fixed
		Large gap in switch board cutouts.
		MCB cover missing
		MCB not fixed
		Power point socket missing
		Power point socket not provided
		Switch board not finished properly
		Switch box to be fixed
		Switches missing

3.1.2 *Common Area and Amenities*

Following are the parameters considered for inspection of common areas and amenities such as: Stilt Area, Staircase Area, Terrace, External Wall & Lift.

Components	Parameters inspected
• Civil • Plumbing • Electrical & Communication	• Building elements: quality and finish • Plumbing fixtures and quality • Electrical fixtures and quality

3.1.3 *Development Works*

Broadly following are the development works considered for quality inspection:

1. Water supply
2. Waste Water Treatment Facility
3. Roads
4. Storm Water Drains
5. Solid Waste Management

6. Electrification

3.2 Parameters Considered for Inspection of Specific Aspects

Based on the preliminary survey, following two specific visual inspection were conducted to assess whether the works executed are as per the specifications provided in the contract documents as well as amendments made from time to time by CGEWHO.

1. Work Specification check
2. Product Make check

The formats are so designed so as to capture all the items covered viz., Flats, Common areas & amenities and development works.

3.2.1 *Work Specification Check (Flats)*

Work Specification with respect to internal works for the flats are tabulated.

The format of the table used is as follows:

Sl No.	*Contract clause No.*	*SCHEDULE AS PER CONTRACT AGREEMENT*	*ACTUALS AT SITE YES / NO*
1	6.2.4	Arrangement for fixing of an Air Conditioner/Air Cooler below the window cill in Drawing and Bedrooms	
		FLOORING	
2	7.3.1.1	Marble Flooring in Drawing, Dining and connected circulation space	
3	7.3.1.2	Mosaic tiles with light coloured cement ACC Jamul or Equivalent)	
4	7.3.1.3	Non Skid Ceramic Tiles in Toilets and Kitchen	
5	7.3.2.7	Non Skid ceramic tiles shall be cut to beveled edge at corners and cut tiles if required shall be laid at the end of the floor only	
6	7.4.0/7.4.5	100mm high Skirting /dado matching with flooring to be provided and adjusted to avoid cut tiles in dado	
7	7.4.3	Kitchen shall be provided with tiles up to 60 cm above kitchen platform and in wet area below the kitchen platform	

8	7.5.0	Kitchen of all types shall have polished granite slab 20mm in thickness of approved colour & quality fixed on a RCC Counter and laid in lengths of 1metre approx. Rounding off edges(Half rounding),	
9	7.5.0	75 MM wide (approx) matching granite slab skirting above kitchen counter as well as front edge of counter jointed with white cement	
10	7.5.0	Providing hole for Gas pipe in Granite slab and RCC slab	
11	7.6.0	Arrangement Including electrical points to be provided in the kitchen for Exhaust fan geyser	
		WOOD/ALUMINIUM WORK AND JOINERY	
12	8.2.1	All door shutters in complex except those in community centre shall be Solid core flush door shutters	
13	8.2.1	Window shutters shall be made up of Aluminum box sections with 4mm thick glazing (10 kg/sqm)	
14	8.2.1	Window frames shall be double rebated Aluminum box sections having both shutters i.e., glaze as well as fly proof.	
15	8.2.1	Flush door shutters shall be 35 mm thick exterior grade (external door) & 31 mm thick (internal door) IS Marked	
16	8.2.2	Toilets shall have FRP molded frames of section 90 x 45 mm with FRP thickness of 2 mm.	
17	8.2.2	Toilets shall have FRP moulded shutters 28 mm thickness with FRP thickness of 1.5mm to 2 mm shall be provided.	
18	8.2.3	The front door of the DU s shall be a flush door or Fire proof door as required by Local authority.	
19	8.2.3	The front door shall have double rebate and a security door of MS with fly proof gauge shall be provided	
20	8.2.3	The front door shall have double rebate and a security door of MS with fly proof gauge shall be provided	
	8.3.0	***Hardware Fittings***	
21	8.3.1	Doors shall have brass oxidised fittings and windows shall have aluminum oxidesed fittings	
22	8.3.1	All Doors shall have Protective rubber buffer fixed on wall	
23	8.3.1	The main entrance door of each dwelling unit shall be fitted with an 180 degree Spy glass and a ***Godrej Night Latch***	
24	8.3.1	The door shutters opening onto Balconies, Verandahs and Terraces Shall be additionally provided with ***300 mm aluminum sliding bolt*** on their outside.	
25	8.3.2	Double hanging floor door stoppers on all door shutters and 75 x 12 mm aluminum baby latch in toilet doors and C.P MS safety chain in main entrance door shall also be provided in all type of DUs	
		STEEL WORK	
26	9.2.0	All DUs with Pressed steel single rebated for internal doors and double rebated for external doors	

27	9.2.0	Windows shall have side hung Aluminum frame with Fly proof arrangement	
28	9.3.1	The double rebated Frames and mullions shall be provided hinges on both sides for fixing of wire gauge shutters. Exterior door and windows shall be double rebated	
29	9.4.1	PVC and MS Circular sleeves of matching size, and packing of plywood shall be provided in the frames and wooden shutters respectively for firmly fixing the sliding tower bolts, Aldrops etc.,	
30	9.6.0	Railings shall be provided with 50 mm MS (Light) pipe handrail in Balconies	
31	9.6.0	One window of each bed room and living and dining rooms shall be provided with a MS openable and lockable grill with frame for installation of Air conditioner/Air cooler	
		FINISHING	
32	11.2.1	Straight cut running grooves provided at junction of walls above skirting and junctions with RCC Members	
33	11.2.2	Straight cut /Running 8 mm wide grooves provided at junctions of ceiling with walls/RCC Members	
34	11.2.3	Plaster to be laid flush with surface of Dado in Toilets	
35	11.2.6	Floating coat of neat cement on top surface of sunshades and kitchen shelves, projected window cills/top of loft slab etc.,	
36	11.2.7	Plaster of Paris punning shall be provided over plaster on walls and ceilings inside all dwelling units and balconies	
37	11.2.8	Oil bound distemper in to give an even shade shall be provided in all Dus. Ceilings to have white wash over Plaster of Paris Punning	
		FINISHING	
38	11.7.0	All holes, openings ,breakages etc made in the wall shall be filled up with CC and patch plastered in conformity with the rest of the wall	
39	11.8.0	A groove at the joints of RCC and B/W may be provided as specified by the Organisation	
		NUMBERING OF Dus	
40	11.9.0	Steel letters of approved size showing numbering of individual DUs shall be fixed with adhesives on the entrance doors.	
		SANITARY WORK	
41	12.3.0	CP fittings shall be Chromium plated brass ,with elegant /deluxe knobs, heavy gauge /weight brass shall be fixed to wall with CP Brass screws and washers fixed in to rawl plug of matching size drilled in the wall	
42	12.4.1A-I	Orissa type Indian W.C-580 x 440 mm with low level cistern-1	
43	12.4.1A-ii	Stainless steel sink without drain board-1	

44	iii	550 x 400 mm wash basin with single 15 mm C.P pillar cock-I	
45	iv	C.P. Towel ring-1	
46	v	600 x 450 mm mirror with PVC FRAME-1	
47	vi	550 mm chinaware soap tray-1	
48	vii	C.P Towel rail 600 x12 mm-1	
49	viii	100 mm dia C.P Shower rose with 380 mm arm-1	
50	ix	C.P Angle valve with C.P Brass pipe-2 nos	
51	x	C.P Concealed stop cock-15/20 mm-5 nos	
52	xi	C.P Long body bib cock 15 mm =4 nos	
53	xi	C.P Bib cock 15 mm =1 no	
54	12.4.0	provision for plumbing connections for washing machine shall be made	
55	12.5.6-ii	fresh water connection to be provided in the kitchen	
56	12.7.8	rain water from balconies ,landings shall be discharged in to the rainwater pipes 150 x 150 mm cast iron gratings shall be provided at the mouth in the khurrah to discharge the rainwater	
		internal electrical works	
57	13.1.0	jobs connected with electrical installation, such as cutting/drilling of holes , chases through walls and floors etc., and making good to restore to the original condition	
58	13.4.2j	All DUs except for type A shall have an AC point and the same shall have to be provided with separate MCB	
59	13.5.0-ii	TV socket one point in Living/Dining and two points in each bed room-2 points total	
60	13.6.0	Telephone socket one in living cum dining and one in Master bed room-Total=2 nos	
		internal electrical works-Mouting heights	
61		Socket for exhaust fan= 7 feet 6 inches	
62		Buzzer/Bell = 6 feet 6 inches	
63		Switch boards =4 feet (bottom)	
64		5 amps socket = 6 feet (bottom)	
65		5/15 amps power point in rooms and kitchen=6 feet and 3 feet 6 inches	
66		Tube light in kitchen =5 feet	
67		Wall bracket point = 6 feet 6 inches	
68		Distribution boards =4 feet 6 inches	
69		15 Amp power point for geyser =5 feet 6 inches	
70		AC point = 3 feet 6 inches	
71	13.8.0-a	Junction boxes of size more than 100 mm x 150mm shall be provided with 4 mm thick phenolic laminated sheet cover	
72	13.10.2-b(x)	All DB s shall be stove Enameled ,duly Phosphated, with anti-rust conditioning etc., complete, finished to Ivory shade	
	14.2.0	***Schedule of Electrical points***	
73		Light points = 12 nos	

74		Ceiling fans point = 3 nos				
75		5 A socket + switch =6 nos				
76		15 A socket + switch =5 nos				
77		Call bell switch ==1 no				
78		Exhaust fan point ===2 nos				
79		Air conditioner point		1		
79		cable point		2		
80		phone point		2		

3.2.2 *Work Specification Check (Common Areas and Amenities)*

In respect of common area such as Stilt, Staircase, Lift, Terrace and External Wall, visual inspection was carried out on the basis of following format given at 3.2.1.

3.2.3 *Work Specification Check (Development Works)*

Inspection of development works such as Water supply, Waste Water Treatment Facility, Roads, Storm Water Drains Electrification was carried out based on visual inspection, design criteria and test reports furnished by CGEWHO on the basis of item given in the tender document (Specifically Page 32 -34, 104 – 109 and 151 -159).

3.2.4 *Product Make check*

The identification of components to be visually verified was limited based on the list of complaints received from the allottees. The following table gives the list of items to be verified with respect to that whether the specific brands are used in the project.

S.No.	Items for which complaint received from Allottee
Civil Components	
1	Flush Doors
2	Iron Mongery
3	Locks
4	Glazed Tiles
5	Ceramic Tiles
6	Glass
7	Aluminum Fittings (hardware)
7.a	Window

	7.b	Doors and window fixtures
Sanitary		
	8.a	Vitreous China ware
	8.b	Stainless Steel Sinks
	8.C	CP Fittings, Accessories & Valve
	8.d	CP Waste and Flush pipes
	8.e	Brass Stop and Bib cock
	8.f	PVC Cistern
Electrical		
	9.a	MCB
	9.b	Switches

The verification of this was done by based on

1. The tender document
2. Visual inspection and
3. Few sample invoices from CGEGWHO in respect of those items in which complaints have been received from the allottees
4. List of approval status furnished be CGEWHO (*Updated list from CGEWHO vide letter dt: 28.09.2012 appended in Vol.II*)

4 Inferences

4.1 General Aspects:

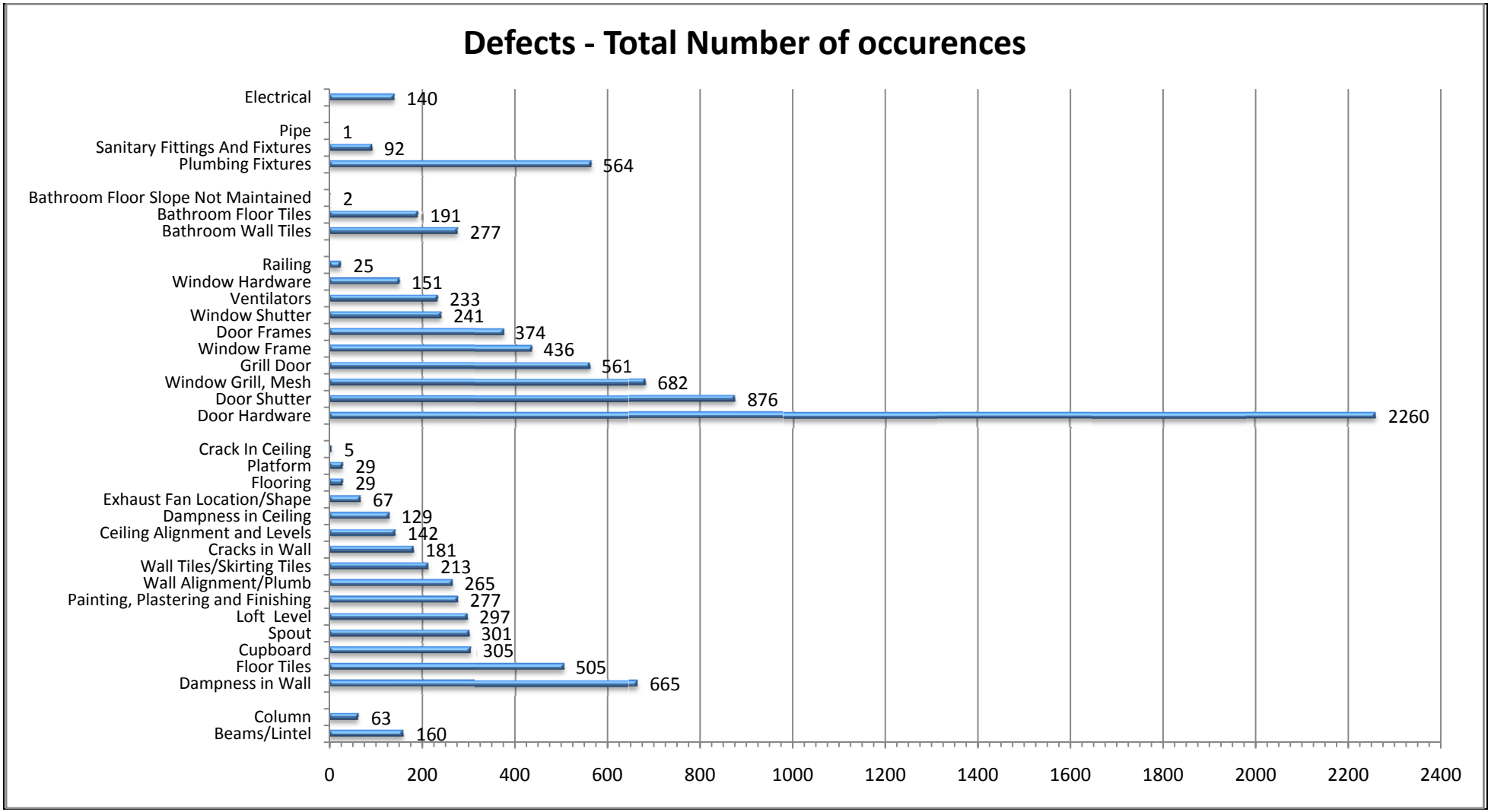
4.1.1 *Individual Flats*

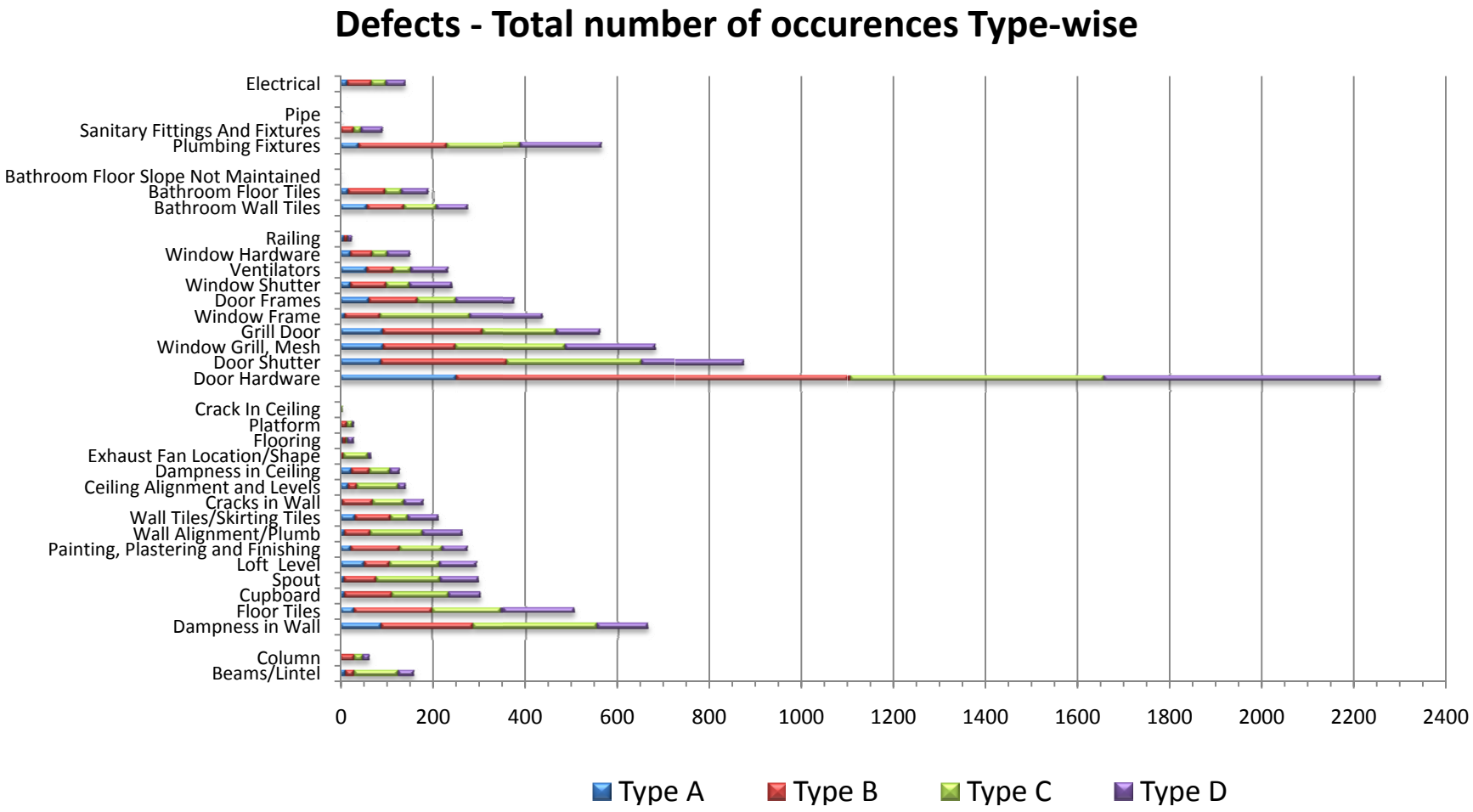
- Total 471 no of Houses inspected out of 572 Flats
- **101** out of the **572** flats could not be inspected as the houses were found locked at the time of scheduled inspection dates. Further, allottees were given additional opportunities to open their flats for inspection. Finally inspection was discontinued, under intimation to CGEWHO.
- Results of the analysis are presented as tables and charts

4.1.1.1 Defects (Number of Occurrences)

Work	Core Components	Parameters Looked at	No of Occurrences *
Civil	Column & Beam	Beams/Lintel	160
		Column	63
	Floor, Walls, Ceiling, Loft, Cupboard & Platform	Dampness in Wall	665
		Floor Tiles	505
		Cupboard	305
		Spout	301
		Loft Level	297
		Painting, Plastering and Finishing	277
		Wall Alignment/Plumb	265
		Wall Tiles/Skirting Tiles	213
		Cracks in Wall	181
		Ceiling Alignment and Levels	142
		Dampness in Ceiling	129
		Exhaust Fan Location/Shape	67
		Flooring	29
		Platform	29

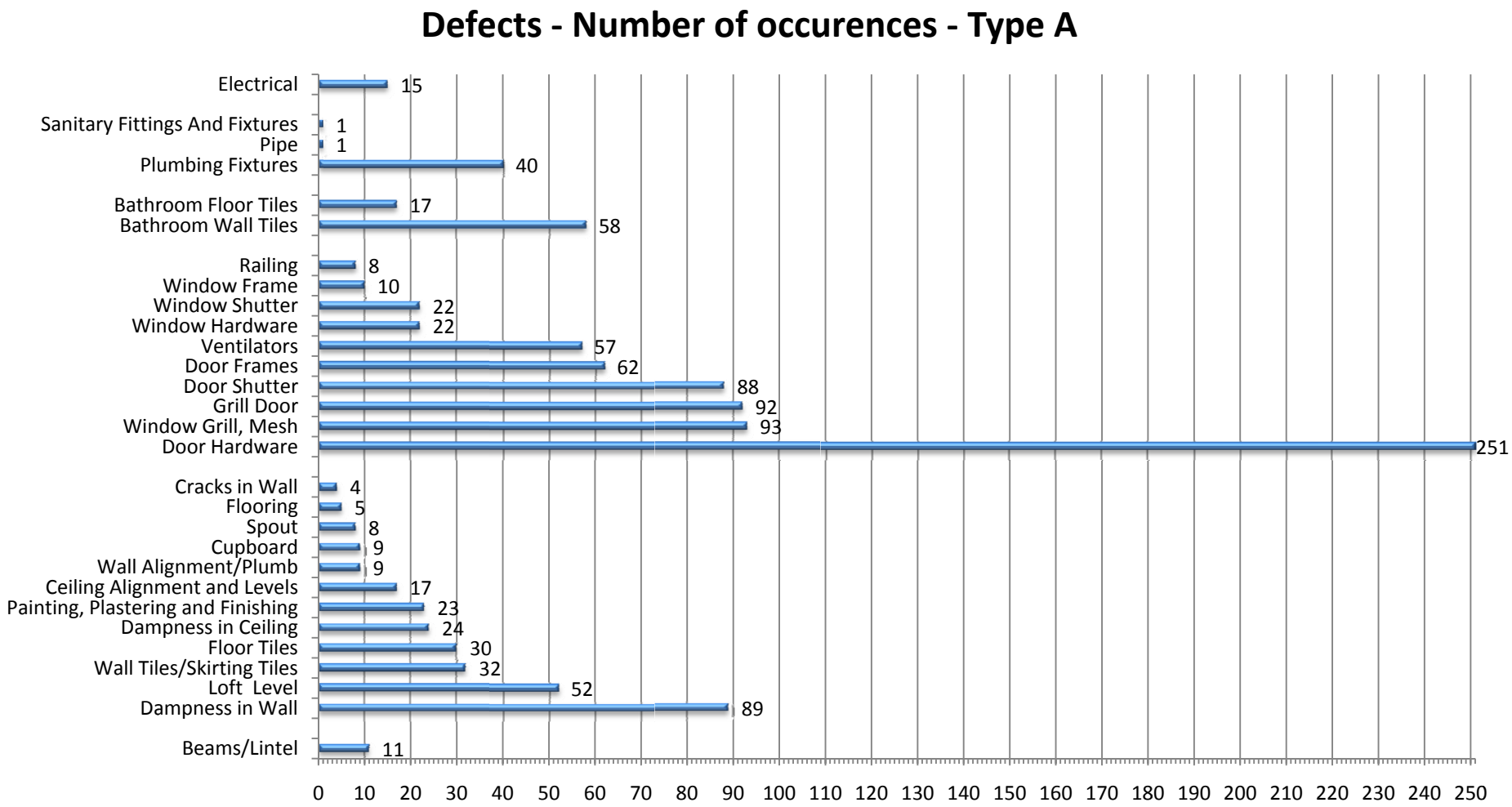
Work	Core Components	Parameters Looked at	No of Occurrences*
	Door, Window & Grills	Door Hardware	2260
		Door Shutter	876
		Window Grill, Mesh	682
		Grill Door	561
		Window Frame	436
		Door Frames	374
		Window Shutter	241
		Ventilators	233
		Window Hardware	151
		Railing	25
	Toilet	Bathroom Wall Tiles	277
		Bathroom Floor Tiles	191
		Bathroom Floor Slope Not Maintained	2
Plumbing	Plumbing & Sanitary Works	Plumbing Fixtures	564
		Sanitary Fittings And Fixtures	92
		Pipe	1
Electrical Works	Electrical Works	Electrical	140
	* For example, if the floor tiles are defective in three rooms in the same flat, then 'number of occurrences' is reported as three		


Defects - Total Number of occurences
Electrical 140
Pipe 1
Sanitary Fittings And Fixtures 92
Plumbing Fixtures 564
Bathroom Floor Slope Not Maintained 2
Bathroom Floor Tiles 191
Bathroom Wall Tiles 277
Railing 25
Window Hardware 151
Ventilators 233
Window Shutter 241
Door Frames 374
Window Frame 436
Grill Door 561
Window Grill, Mesh 682
Door Shutter 876
Door Hardware 2260
Crack In Ceiling 5
Platform 29
Flooring 29
Exhaust Fan Location/Shape 67
Dampness in Ceiling 129
Ceiling Alignment and Levels 142
Cracks in Wall 181
Wall Tiles/Skirting Tiles 213
Wall Alignment/Plumb 265
Painting, Plastering and Finishing 277
Loft Level 297
Spout 301
Cupboard 305
Floor Tiles 505
Dampness in Wall 665
Column 63
Beams/Lintel 160
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400


Defects - Total number of occurences Type-wise
Electrical
Pipe
Sanitary Fittings And Fixtures
Plumbing Fixtures
Bathroom Floor Slope Not Maintained
Bathroom Floor Tiles
Bathroom Wall Tiles
Railing
Window Hardware
Ventilators
Window Shutter
Door Frames
Window Frame
Grill Door
Window Grill, Mesh
Door Shutter
Door Hardware
Crack In Ceiling
Platform
Flooring
Exhaust Fan Location/Shape
Dampness in Ceiling
Ceiling Alignment and Levels
Cracks in Wall
Wall Tiles/Skirting Tiles
Wall Alignment/Plumb
Painting, Plastering and Finishing
Loft Level
Spout
Cupboard
Floor Tiles
Dampness in Wall
Column
Beams/Lintel
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
Type A
Type B
Type C
Type D

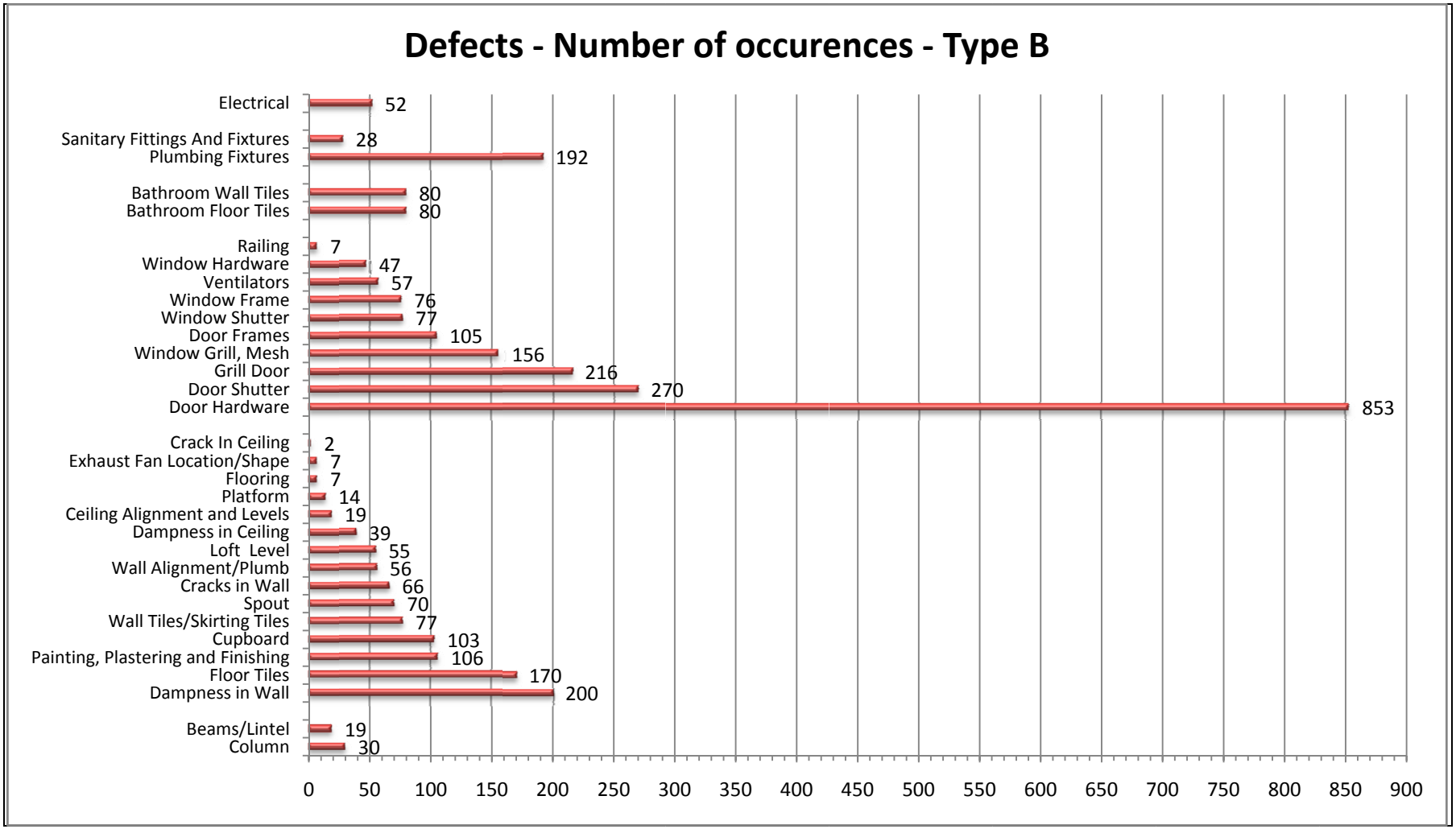
Number of Occurrences - Type wise - A Block			
Work	**Core Components**	**Parameters Looked at**	**No of Occurrences***
Civil	**Column & Beam**	Beams/Lintel	11
		Column	0
	Floor, Walls, Ceiling, Loft, Cupboard & Platform	Dampness in Wall	89
		Loft Level	52
		Wall Tiles/Skirting Tiles	32
		Floor Tiles	30
		Dampness in Ceiling	24
		Painting, Plastering and Finishing	23
		Ceiling Alignment and Levels	17
		Wall Alignment/Plumb	9
		Cupboard	9
		Spout	8
		Flooring	5
		Cracks in Wall	4
	Door, Window & Grills	Door Hardware	251
		Window Grill, Mesh	93
		Grill Door	92
		Door Shutter	88
		Door Frames	62
		Ventilators	57
		Window Hardware	22
		Window Shutter	22
		Window Frame	10
		Railing	8

Work	Core Components	Parameters Looked at	No of Occurrences*
	Toilet	Bathroom Wall Tiles	58
		Bathroom Floor Tiles	17
		Bathroom Floor Slope Not Maintained	0
Plumbing	Plumbing & Sanitary Works	Plumbing Fixtures	40
		Pipe	1
		Sanitary Fittings And Fixtures	1
Electrical Works	Electrical Works	Electrical	15
	* For example, if the floor tiles are defective in three rooms in the same flat, then 'number of occurrences' is reported as three		


Defects - Number of occurences - Type A
Electrical
15
Sanitary Fittings And Fixtures
1
Pipe
1
Plumbing Fixtures
40
Bathroom Floor Tiles
17
Bathroom Wall Tiles
58
Railing
8
Window Frame
10
Window Shutter
22
Window Hardware
22
Ventilators
57
Door Frames
62
Door Shutter
88
Grill Door
92
Window Grill, Mesh
93
Door Hardware
251
Cracks in Wall
4
Flooring
5
Spout
8
Cupboard
9
Wall Alignment/Plumb
9
Ceiling Alignment and Levels
17
Painting, Plastering and Finishing
23
Dampness in Ceiling
24
Floor Tiles
30
Wall Tiles/Skirting Tiles
32
Loft Level
52
Dampness in Wall
89
Beams/Lintel
11
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250

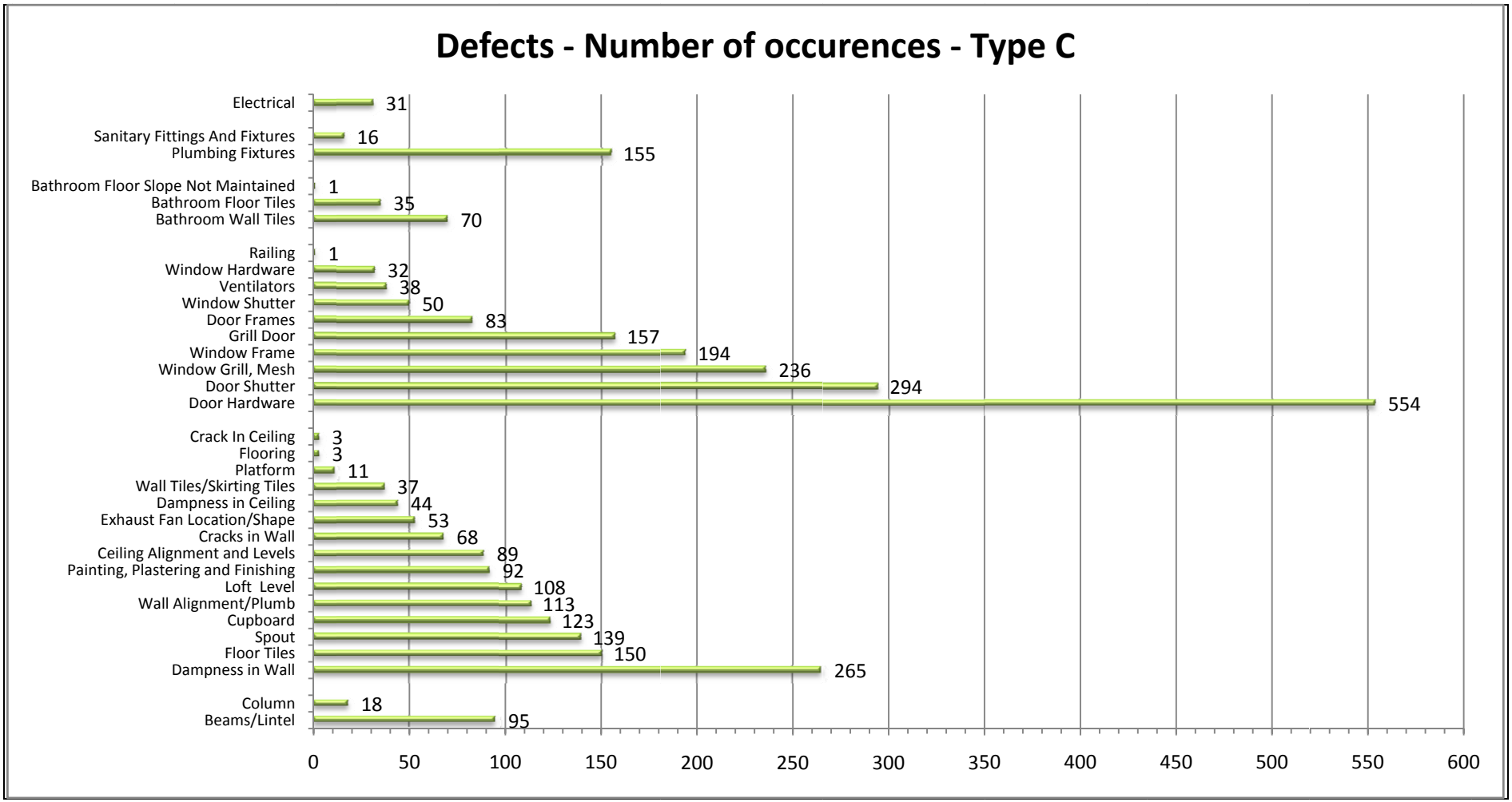
Number of Occurrences - Type wise - B Block			
Work	**Core Components**	**Parameters Looked at**	**No of Occurrences***
Civil	**Column & Beam**	Column	30
		Beams/Lintel	19
	Floor, Walls, Ceiling, Loft, Cupboard & Platform	Dampness in Wall	200
		Floor Tiles	170
		Painting, Plastering and Finishing	106
		Cupboard	103
		Wall Tiles/Skirting Tiles	77
		Spout	70
		Cracks in Wall	66
		Wall Alignment/Plumb	56
		Loft Level	55
		Dampness in Ceiling	39
		Ceiling Alignment and Levels	19
		Platform	14
		Flooring	7
		Exhaust Fan Location/Shape	7
		Crack In Ceiling	2 2
	Door, Window & Grills	Door Hardware	853
		Door Shutter	270
		Grill Door	216
		Window Grill, Mesh	156
		Door Frames	105
		Window Shutter	77
		Window Frame	76
		Ventilators	57
		Window Hardware	47
		Railing	7

Work	Core Components	Parameters Looked at	No of Occurrences*
	Toilet	Bathroom Floor Tiles	80
		Bathroom Wall Tiles	80
		Bathroom Floor Slope Not Maintained	0
Plumbing	Plumbing & Sanitary Works	Plumbing Fixtures	192
		Sanitary Fittings And Fixtures	28
		Pipe	0
Electrical Works	Electrical Works	Electrical	52
	* For example, if the floor tiles are defective in three rooms in the same flat, then 'number of occurrences' is reported as three		


Defects - Number of occurences - Type B
Electrical 52
Sanitary Fittings And Fixtures 28
Plumbing Fixtures 192
Bathroom Wall Tiles 80
Bathroom Floor Tiles 80
Railing 7
Window Hardware 47
Ventilators 57
Window Frame 76
Window Shutter 77
Door Frames 105
Window Grill, Mesh 156
Grill Door 216
Door Shutter 270
Door Hardware 853
Crack In Ceiling 2
Exhaust Fan Location/Shape 7
Flooring 7
Platform 14
Ceiling Alignment and Levels 19
Dampness in Ceiling 39
Loft Level 55
Wall Alignment/Plumb 56
Cracks in Wall 66
Spout 70
Wall Tiles/Skirting Tiles 77
Cupboard 103
Painting, Plastering and Finishing 106
Floor Tiles 170
Dampness in Wall 200
Beams/Lintel 19
Column 30
0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900

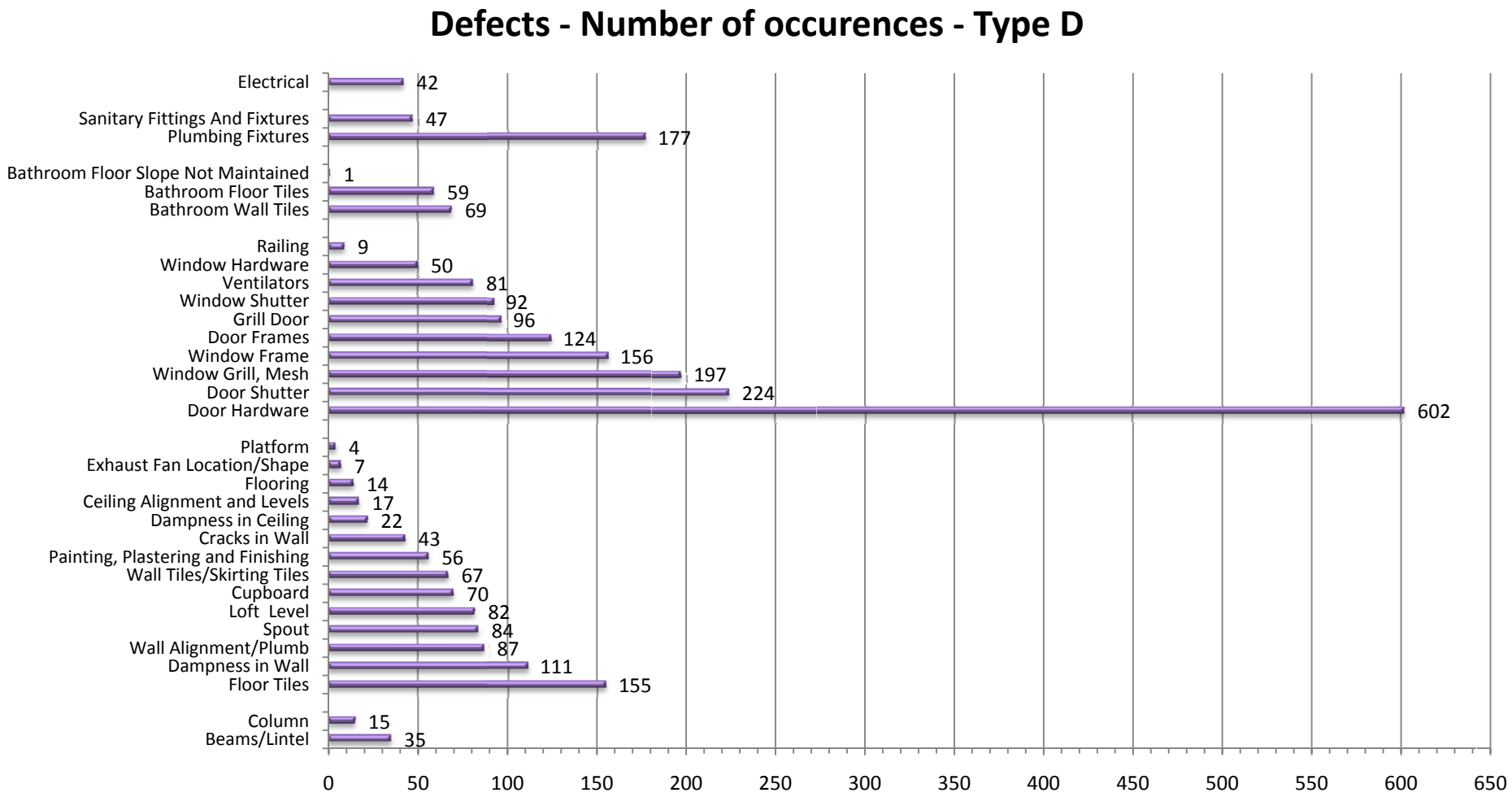
Number of Occurrences - Type wise - C Block			
Work	**Core Components**	**Parameters Looked at**	**No of Occurrences***
Civil	**Column & Beam**	Beams/Lintel	95
		Column	18
	Floor, Walls, Ceiling, Loft, Cupboard & Platform	Dampness in Wall	265
		Floor Tiles	150
		Spout	139
		Cupboard	123
		Wall Alignment/Plumb	113
		Loft Level	108
		Painting, Plastering and Finishing	92
		Ceiling Alignment and Levels	89
		Cracks in Wall	68
		Exhaust Fan Location/Shape	53
		Dampness in Ceiling	44
		Wall Tiles/Skirting Tiles	37
		Platform	11
		Flooring	3
		Crack In Ceiling	3
	Door, Window & Grills	Door Hardware	554
		Door Shutter	294
		Window Grill, Mesh	236
		Window Frame	194
		Grill Door	157
		Door Frames	83
		Window Shutter	50
		Ventilators	38
		Window Hardware	32
		Railing	1

Work	Core Components	Parameters Looked at	No of Occurrences*
	Toilet	Bathroom Wall Tiles	70
		Bathroom Floor Tiles	35
		Bathroom Floor Slope Not Maintained	1
Plumbing	Plumbing & Sanitary Works	Plumbing Fixtures	155
		Sanitary Fittings And Fixtures	16
		Pipe	0
Electrical	Electrical Works	Electrical	31
	* For example, if the floor tiles are defective in three rooms in the same flat, then 'number of occurrences' is reported as three		


Defects - Number of occurences - Type C
Electrical
Sanitary Fittings And Fixtures
Plumbing Fixtures
Bathroom Floor Slope Not Maintained
Bathroom Floor Tiles
Bathroom Wall Tiles
Railing
Window Hardware
Ventilators
Window Shutter
Door Frames
Grill Door
Window Frame
Window Grill, Mesh
Door Shutter
Door Hardware
Crack In Ceiling
Flooring
Platform
Wall Tiles/Skirting Tiles
Dampness in Ceiling
Exhaust Fan Location/Shape
Cracks in Wall
Ceiling Alignment and Levels
Painting, Plastering and Finishing
Loft Level
Wall Alignment/Plumb
Cupboard
Spout
Floor Tiles
Dampness in Wall
Column
Beams/Lintel
31
16
155
1
35
70
1
32
38
50
83
157
194
236
294
554
3
3
11
37
44
53
68
89
92
108
113
123
139
150
265
18
95
0
50
100
150
200
250
300
350
400
450
500
550
600

Number of Occurrences - Type wise - D Block			
Work	**Core Components**	**Parameters Looked at**	**No of Occurrences***
Civil	**Column & Beam**	Beams/Lintel	35
		Column	15
	Floor, Walls, Ceiling, Loft, Cupboard & Platform	Floor Tiles	155
		Dampness in Wall	111
		Wall Alignment/Plumb	87
		Spout	84
		Loft Level	82
		Cupboard	70
		Wall Tiles/Skirting Tiles	67
		Painting, Plastering and Finishing	56
		Cracks in Wall	43
		Dampness in Ceiling	22
		Ceiling Alignment and Levels	17
		Flooring	14
		Exhaust Fan Location/Shape	7
		Platform	4
	Door, Window & Grills	Door Hardware	602
		Door Shutter	224
		Window Grill, Mesh	197
		Window Frame	156
		Door Frames	124
		Grill Door	96
		Window Shutter	92
		Ventilators	81
		Window Hardware	50
		Railing	9

Work	Core Components	Parameters Looked at	No of Occurrences*
	Toilet	Bathroom Wall Tiles	69
		Bathroom Floor Tiles	59
		Bathroom Floor Slope Not Maintained	1
Plumbing	Plumbing & Sanitary Works	Plumbing Fixtures	177
		Sanitary Fittings And Fixtures	47
		Pipe	0
Electrical	Electrical Works	Electrical	42
	* For example, if the floor tiles are defective in three rooms in the same flat, then 'number of occurrences' is reported as three		


Defects - Number of occurences - Type D
Electrical
Sanitary Fittings And Fixtures
Plumbing Fixtures
Bathroom Floor Slope Not Maintained
Bathroom Floor Tiles
Bathroom Wall Tiles
Railing
Window Hardware
Ventilators
Window Shutter
Grill Door
Door Frames
Window Frame
Window Grill, Mesh
Door Shutter
Door Hardware
Platform
Exhaust Fan Location/Shape
Flooring
Ceiling Alignment and Levels
Dampness in Ceiling
Cracks in Wall
Painting, Plastering and Finishing
Wall Tiles/Skirting Tiles
Cupboard
Loft Level
Spout
Wall Alignment/Plumb
Dampness in Wall
Floor Tiles
Column
Beams/Lintel
42
47
177
1
59
69
9
50
81
92
96
124
156
197
224
602
4
7
14
17
22
43
56
67
70
82
84
87
111
155
15
35
0
50
100
150
200
250
300
350
400
450
500
550
600
650

Conclusion:

Analysis of the occurrences of defects indicates the following

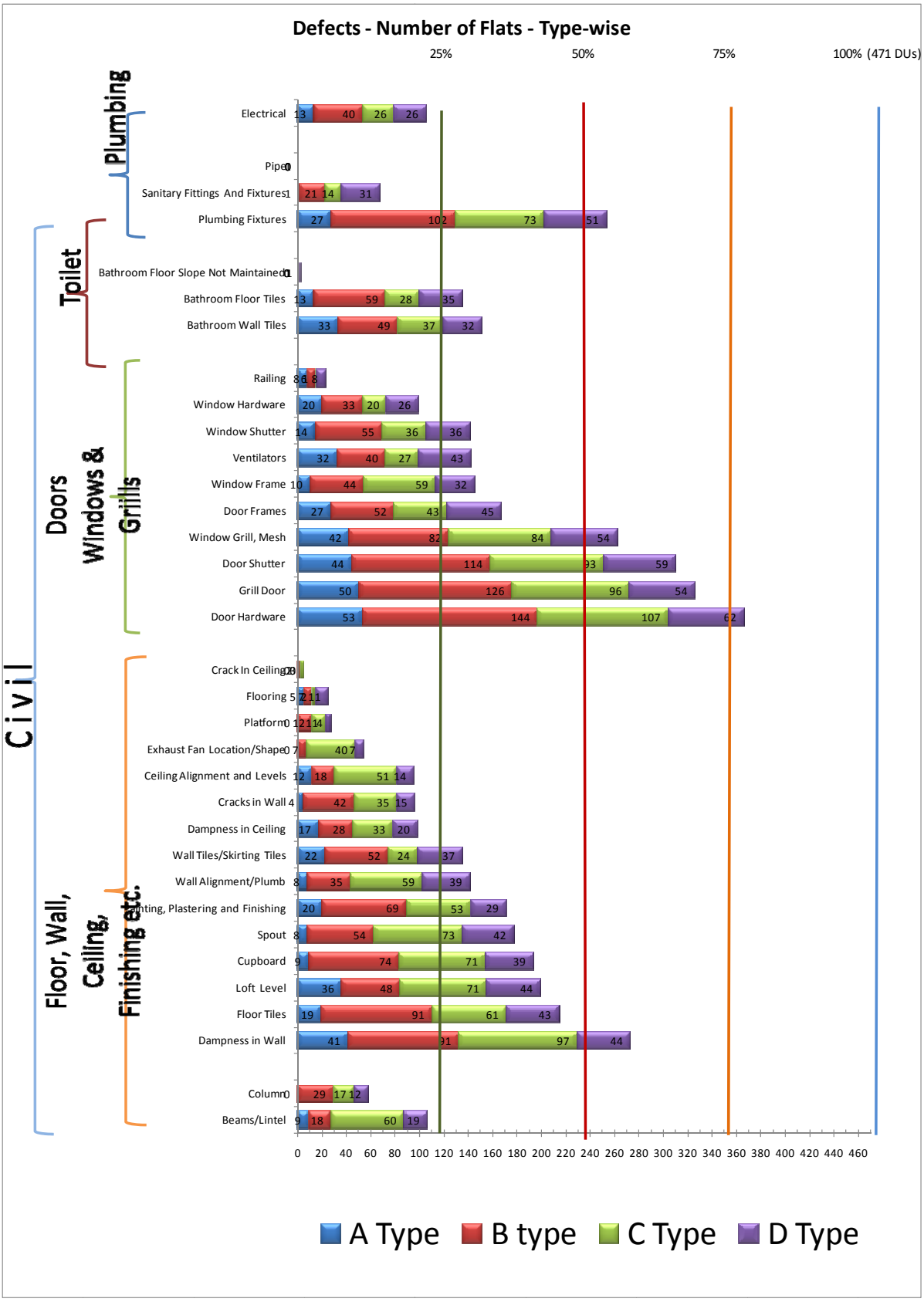
- Door hardware has maximum amount of defects.
- The least occurrences of defects are in elements such as column and beams.

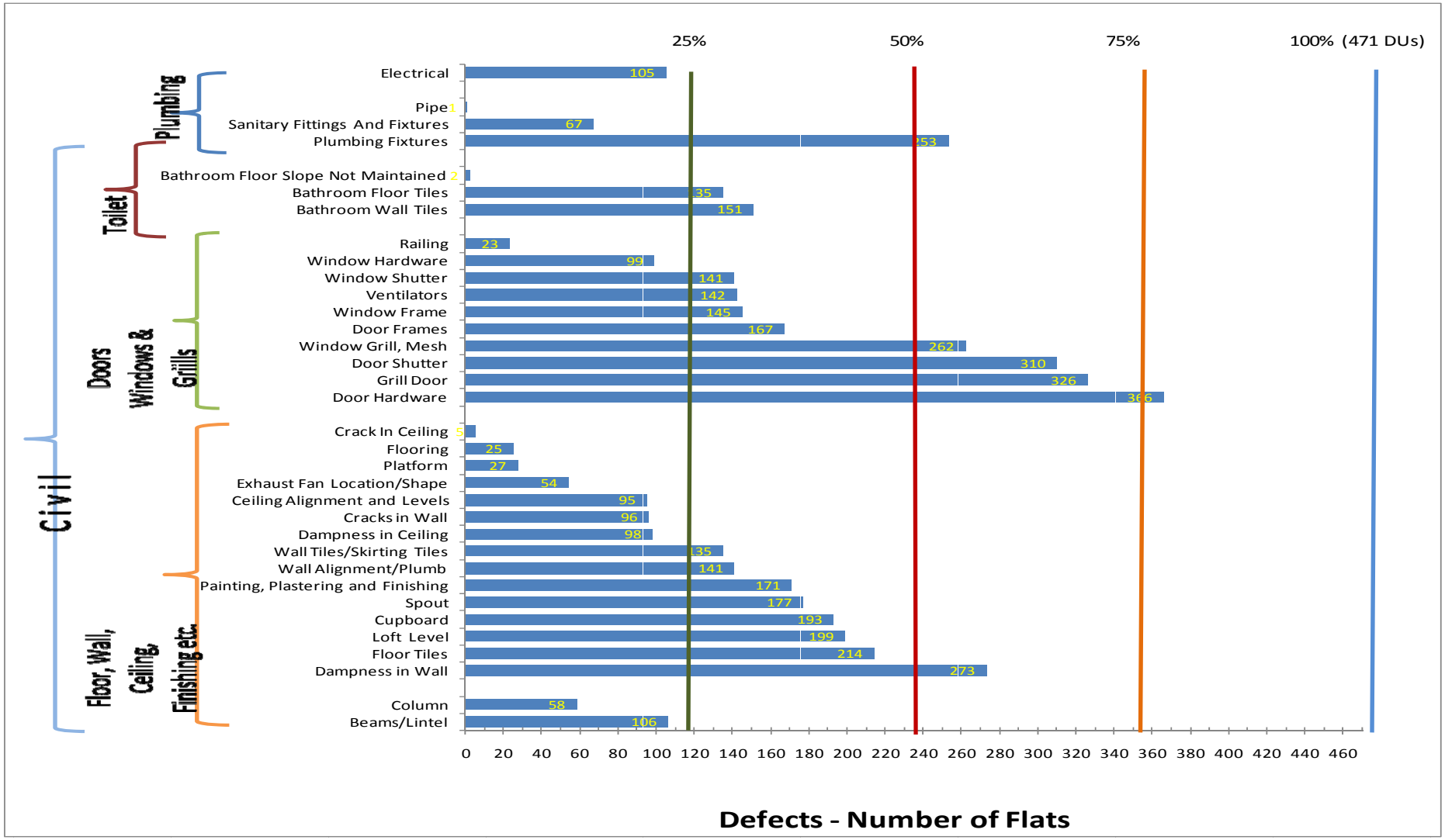
4.1.1.2 Defects (Number of Flats)

Works	Core Components	Parameters Looked at	Number of Flats with defects*	As a % of total number of flats inspected
Civil	Column & Beam	Beams/Lintel	106	23
		Column	58	12
	Floor, Walls, Ceiling, Loft, Cupboard & Platform	Dampness in Wall	273	58
		Floor Tiles	214	45
		Loft Level	199	42
		Cupboard	193	41
		Spout	177	38
		Painting, Plastering and Finishing	171	36
		Wall Alignment/Plumb	141	30
		Wall Tiles/Skirting Tiles	135	29
		Dampness in Ceiling	98	21
		Cracks in Wall	96	20
		Ceiling Alignment and Levels	95	20
		Exhaust Fan Location/Shape	54	11
		Platform	27	6
		Flooring	25	5
		Crack In Ceiling	5	1

Works	Core Components	Parameters Looked at	Number of Flats with defects*	As a % of total number of flats inspected
	Door, Window & Grills	Door Hardware	366	78
		Grill Door	326	69
		Door Shutter	310	66
		Window Grill, Mesh	262	56
		Door Frames	167	35
		Window Frame	145	31
		Ventilators	142	30
		Window Shutter	141	30
		Window Hardware	99	21
		Railing	23	5
	Toilet	Bathroom Wall Tiles	151	32
		Bathroom Floor Tiles	135	29
		Bathroom Floor Slope Not Maintained	2	0
Plumbing & Sanitary	Plumbing & Sanitary Works	Plumbing Fixtures	253	54
		Sanitary Fittings And Fixtures	67	14
		Pipe	1	0
Electrical	Electrical Works	Electrical	105	22

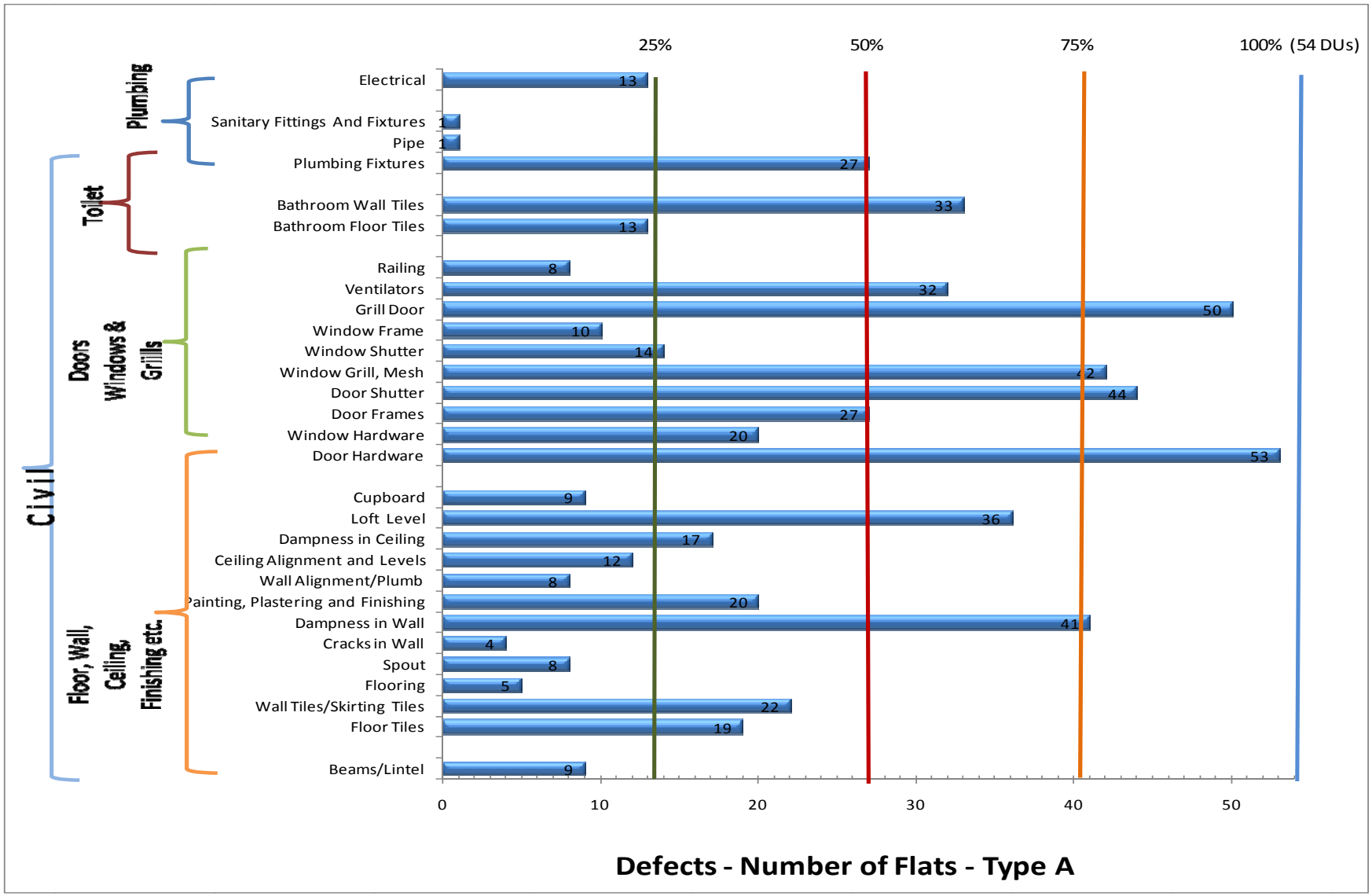
* For example, if the floor tiles are defective in three rooms in the same flat, then 'number of flats' is reported as one.


Defects - Number of Flats - Type-wise
25%
50%
75%
100% (471 DUs)
Civil
Plumbing
Toilet
Doors Windows & Grills
Floor, Wall, Ceiling, Finishing etc.
Electrical 13 40 26 26
Pipe 0
Sanitary Fittings And Fixtures 1 21 14 31
Plumbing Fixtures 27 102 73 51
Bathroom Floor Slope Not Maintained 1
Bathroom Floor Tiles 13 59 28 35
Bathroom Wall Tiles 33 49 37 32
Railing 8 6 8
Window Hardware 20 33 20 26
Window Shutter 14 55 36 36
Ventilators 32 40 27 43
Window Frame 10 44 59 32
Door Frames 27 52 43 45
Window Grill, Mesh 42 82 84 54
Door Shutter 44 114 93 59
Grill Door 50 126 96 54
Door Hardware 53 144 107 62
Crack In Ceiling 2
Flooring 5 7 11
Platform 0 12 14
Exhaust Fan Location/Shape 0 7 40 7
Ceiling Alignment and Levels 12 18 51 14
Cracks in Wall 4 42 35 15
Dampness in Ceiling 17 28 33 20
Wall Tiles/Skirting Tiles 22 52 24 37
Wall Alignment/Plumb 8 35 59 39
Painting, Plastering and Finishing 20 69 53 29
Spout 8 54 73 42
Cupboard 9 74 71 39
Loft Level 36 48 71 44
Floor Tiles 19 91 61 43
Dampness in Wall 41 91 97 44
Column 0 29 17 12
Beams/Lintel 9 18 60 19
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460
A Type
B type
C Type
D Type


25%
50%
75%
100% (471 DUs)
Civil
Plumbing
Toilet
Doors Windows & Grills
Floor, Wall, Ceiling, Finishing etc.
Electrical 105
Pipe 1
Sanitary Fittings And Fixtures 67
Plumbing Fixtures 253
Bathroom Floor Slope Not Maintained 2
Bathroom Floor Tiles 135
Bathroom Wall Tiles 151
Railing 23
Window Hardware 99
Window Shutter 141
Ventilators 142
Window Frame 145
Door Frames 167
Window Grill, Mesh 262
Door Shutter 310
Grill Door 326
Door Hardware 366
Crack In Ceiling 5
Flooring 25
Platform 27
Exhaust Fan Location/Shape 54
Ceiling Alignment and Levels 95
Cracks in Wall 96
Dampness in Ceiling 98
Wall Tiles/Skirting Tiles 135
Wall Alignment/Plumb 141
Painting, Plastering and Finishing 171
Spout 177
Cupboard 193
Loft Level 199
Floor Tiles 214
Dampness in Wall 273
Column 58
Beams/Lintel 106
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460
Defects - Number of Flats

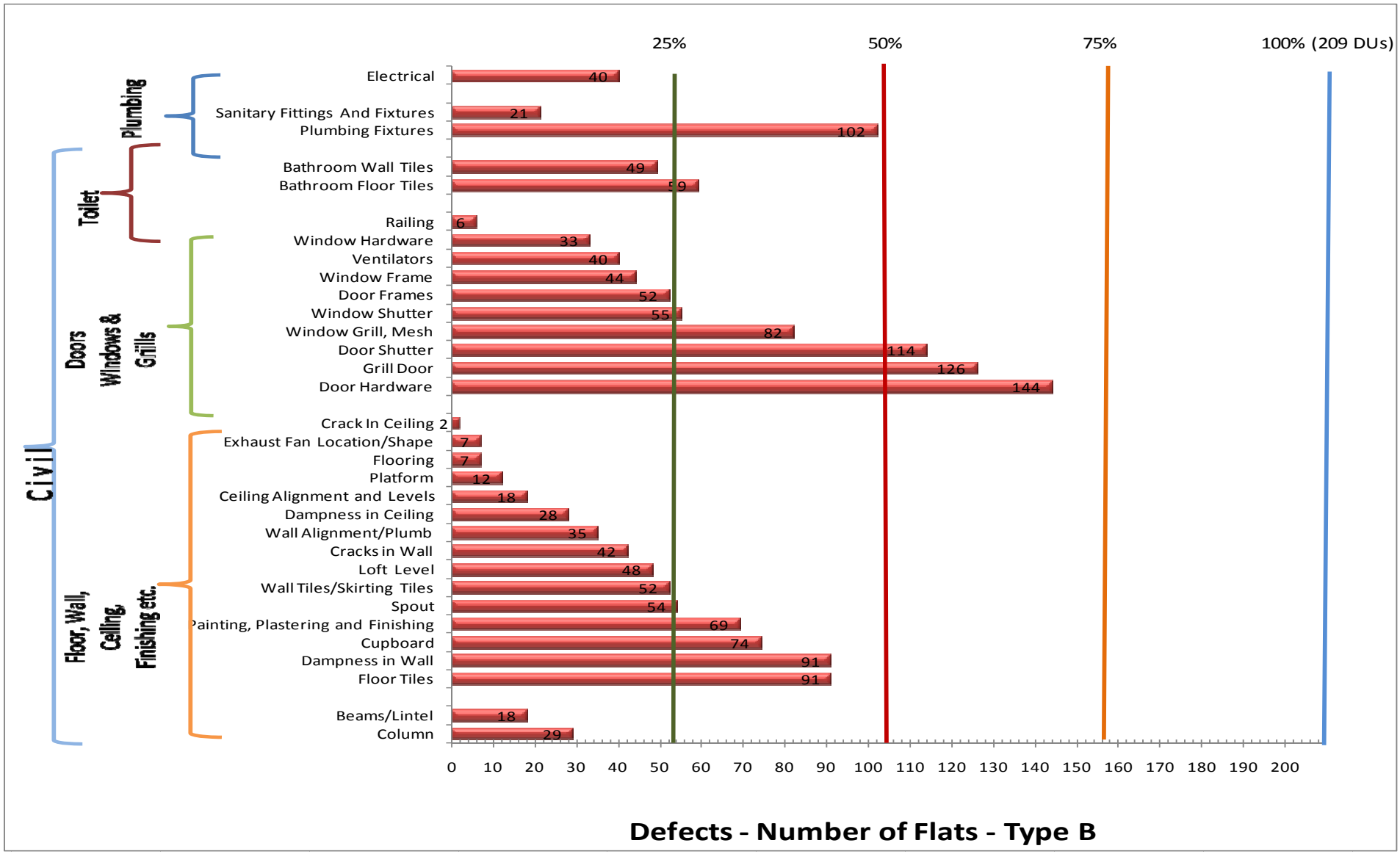
Number of Defects - Type wise - A Block			
Work	**Core Components**	**Parameters Looked at**	**No of Occurrences***
Civil	**Column & Beam**	Beams/Lintel	9
		Column	0
	Floor, Walls, Ceiling, Loft, Cupboard & Platform	Floor Tiles	89
		Wall Tiles/Skirting Tiles	52
		Flooring	32
		Spout	30
		Cracks in Wall	24
		Dampness in Wall	23
		Painting, Plastering and Finishing	17
		Wall Alignment/Plumb	9
		Ceiling Alignment and Levels	9
		Dampness in Ceiling	8
		Loft Level	5
		Cupboard	4
		Floor Tiles	89
		Wall Tiles/Skirting Tiles	52
	Door, Window & Grills	Door Hardware	53
		Window Hardware	20
		Door Frames	27
		Door Shutter	44
		Window Grill, Mesh	42
		Window Shutter	14
		Window Frame	10
		Grill Door	50
		Ventilators	32
		Railing	8

Work	Core Components	Parameters Looked at	No of Occurrences *
	Toilet	Bathroom Floor Tiles	13
		Bathroom Wall Tiles	33
		Bathroom Floor Slope Not Maintained	0
Plumbing	Plumbing & Sanitary Works	Plumbing Fixtures	27
		Pipe	1
		Sanitary Fittings And Fixtures	1
Electrical Works	Electrical Works	Electrical	13


25%
50%
75%
100% (54 DUs)
Civil
Plumbing
Toilet
Doors Windows & Grills
Floor, Wall, Ceiling, Finishing etc.
Electrical
13
Sanitary Fittings And Fixtures
1
Pipe
1
Plumbing Fixtures
27
Bathroom Wall Tiles
33
Bathroom Floor Tiles
13
Railing
8
Ventilators
32
Grill Door
50
Window Frame
10
Window Shutter
14
Window Grill, Mesh
42
Door Shutter
44
Door Frames
27
Window Hardware
20
Door Hardware
53
Cupboard
9
Loft Level
36
Dampness in Ceiling
17
Ceiling Alignment and Levels
12
Wall Alignment/Plumb
8
ainting, Plastering and Finishing
20
Dampness in Wall
41
Cracks in Wall
4
Spout
8
Flooring
5
Wall Tiles/Skirting Tiles
22
Floor Tiles
19
Beams/Lintel
9
0
10
20
30
40
50
Defects - Number of Flats - Type A

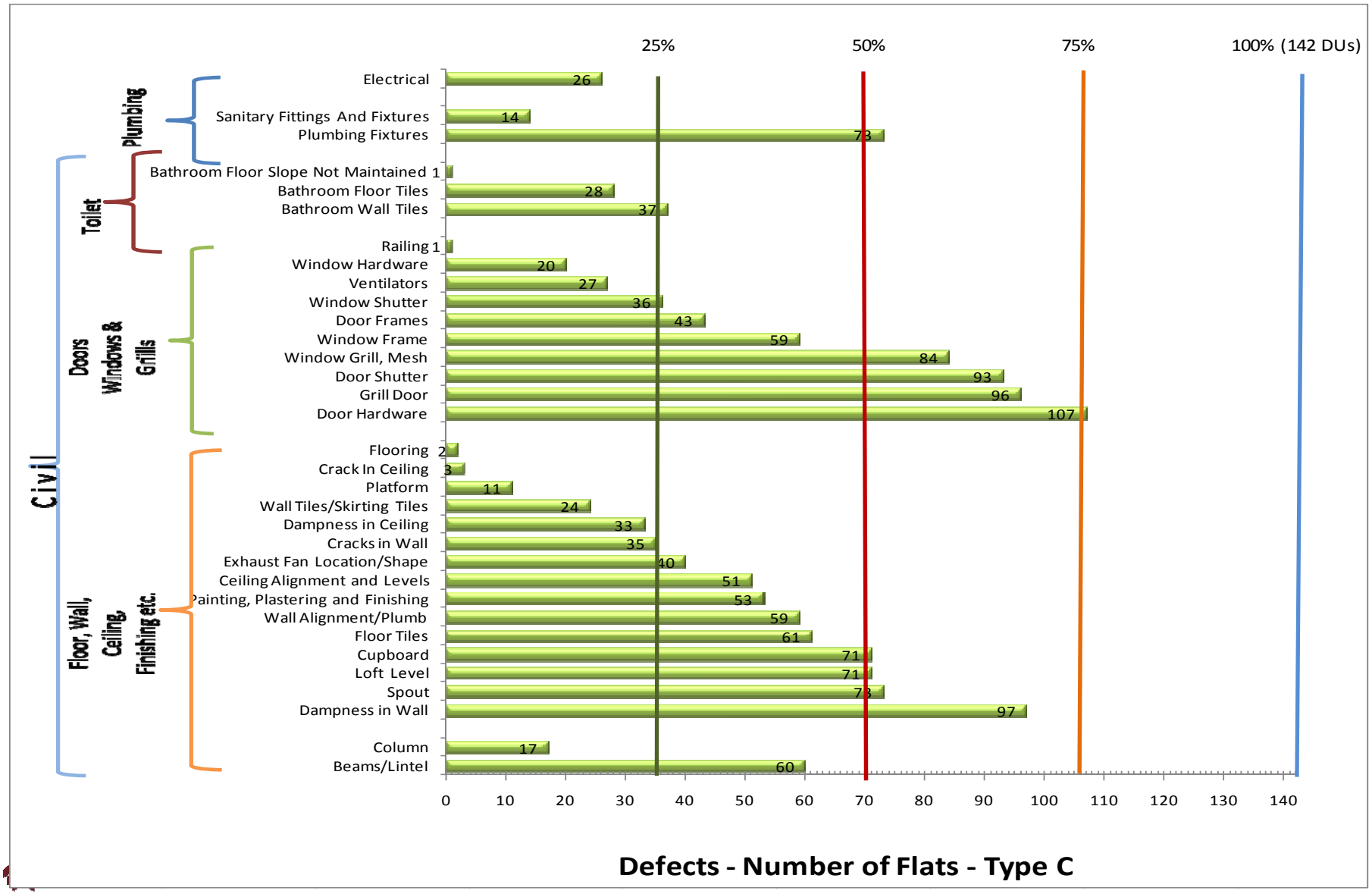
Number of Defects - Type wise - B Block			
Work	**Core Components**	**Parameters Looked at**	**No of Occurrences***
Civil	**Column & Beam**	Column	29
		Beams/Lintel	18
	Floor, Walls, Ceiling, Loft, Cupboard & Platform	Floor Tiles	91
		Dampness in Wall	91
		Cupboard	74
		Painting, Plastering and Finishing	69
		Spout	54
		Wall Tiles/Skirting Tiles	52
		Loft Level	48
		Cracks in Wall	42
		Wall Alignment/Plumb	35
		Dampness in Ceiling	28
		Ceiling Alignment and Levels	18
		Platform	12
		Flooring	7
		Exhaust Fan Location/Shape	7
		Crack In Ceiling	2
	Door, Window & Grills	Door Hardware	144
		Grill Door	126
		Door Shutter	114
		Window Grill, Mesh	82
		Window Shutter	55
		Door Frames	52
		Window Frame	44
		Ventilators	40
		Window Hardware	33
		Railing	6

Work	Core Components	Parameters Looked at	No of Occurrences*
	Toilet	Bathroom Floor Tiles	59
		Bathroom Wall Tiles	49
		Bathroom Floor Slope Not Maintained	0
Plumbing	Plumbing & Sanitary Works	Plumbing Fixtures	102
		Sanitary Fittings And Fixtures	21
		Pipe	0
Electrical Works	Electrical Works	Electrical	40
	* For example, if the floor tiles are defective in three rooms in the same flat, then 'number of occurrences' is reported as three		


25%
50%
75%
100% (209 DUs)
Civil
Plumbing
Toilet
Doors Windows & Grills
Floor, Wall, Ceiling, Finishing etc.
Electrical 40
Sanitary Fittings And Fixtures 21
Plumbing Fixtures 102
Bathroom Wall Tiles 49
Bathroom Floor Tiles 59
Railing 6
Window Hardware 33
Ventilators 40
Window Frame 44
Door Frames 52
Window Shutter 55
Window Grill, Mesh 82
Door Shutter 114
Grill Door 126
Door Hardware 144
Crack In Ceiling 2
Exhaust Fan Location/Shape 7
Flooring 7
Platform 12
Ceiling Alignment and Levels 18
Dampness in Ceiling 28
Wall Alignment/Plumb 35
Cracks in Wall 42
Loft Level 48
Wall Tiles/Skirting Tiles 52
Spout 54
Painting, Plastering and Finishing 69
Cupboard 74
Dampness in Wall 91
Floor Tiles 91
Beams/Lintel 18
Column 29
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Defects - Number of Flats - Type B

Number of Defects - Type wise - C Block			
Work	**Core Components**	**Parameters Looked at**	**No of Occurrences***
Civil	**Column & Beam**	Column	17
		Beams/Lintel	60
	Floor, Walls, Ceiling, Loft, Cupboard & Platform	Flooring	2
		Crack In Ceiling	3
		Platform	11
		Wall Tiles/Skirting Tiles	24
		Dampness in Ceiling	33
		Cracks in Wall	35
		Exhaust Fan Location/Shape	40
		Ceiling Alignment and Levels	51
		Painting, Plastering and Finishing	53
		Wall Alignment/Plumb	59
		Floor Tiles	61
		Loft Level	71
		Cupboard	71
		Spout	73
		Dampness in Wall	97
	Door, Window & Grills	Railing	1
		Window Hardware	20
		Ventilators	27
		Window Shutter	36
		Door Frames	43
		Window Frame	59
		Window Grill, Mesh	84
		Door Shutter	93
		Grill Door	96
		Door Hardware	107

Work	Core Components	Parameters Looked at	No of Occurrences*
	Toilet	Bathroom Floor Slope Not Maintained	1
		Bathroom Floor Tiles	28
		Bathroom Wall Tiles	37
Plumbing	Plumbing & Sanitary Works	Sanitary Fittings And Fixtures	14
		Plumbing Fixtures	73
		Pipe	0
Electrical	Electrical Works	Electrical	26
	* For example, if the floor tiles are defective in three rooms in the same flat, then 'number of occurrences' is reported as three		


25%
50%
75%
100% (142 DUs)
Civil
Plumbing
Toilet
Doors Windows & Grills
Floor, Wall, Ceiling, Finishing etc.
Electrical
26
Sanitary Fittings And Fixtures
14
Plumbing Fixtures
73
Bathroom Floor Slope Not Maintained
1
Bathroom Floor Tiles
28
Bathroom Wall Tiles
37
Railing
1
Window Hardware
20
Ventilators
27
Window Shutter
36
Door Frames
43
Window Frame
59
Window Grill, Mesh
84
Door Shutter
93
Grill Door
96
Door Hardware
107
Flooring
2
Crack In Ceiling
3
Platform
11
Wall Tiles/Skirting Tiles
24
Dampness in Ceiling
33
Cracks in Wall
35
Exhaust Fan Location/Shape
40
Ceiling Alignment and Levels
51
Painting, Plastering and Finishing
53
Wall Alignment/Plumb
59
Floor Tiles
61
Cupboard
71
Loft Level
71
Spout
73
Dampness in Wall
97
Column
17
Beams/Lintel
60
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
Defects - Number of Flats - Type C

Number of Defects - Type wise - D Block			
Work	**Core Components**	**Parameters Looked at**	**No of Occurrences***
Civil	**Column & Beam**	Beams/Lintel	19
		Column	12
	Floor, Walls, Ceiling, Loft, Cupboard & Platform	Dampness in Wall	44
		Loft Level	44
		Floor Tiles	43
		Spout	42
		Wall Alignment/Plumb	39
		Cupboard	39
		Wall Tiles/Skirting Tiles	37
		Painting, Plastering and Finishing	29
		Dampness in Ceiling	20
		Cracks in Wall	15
		Ceiling Alignment and Levels	14
		Flooring	11
		Exhaust Fan Location/Shape	7
		Platform	4
	Door, Window & Grills	Door Hardware	62
		Door Shutter	59
		Window Grill, Mesh	54
		Grill Door	54
		Door Frames	45
		Ventilators	43
		Window Shutter	36
		Window Frame	32
		Window Hardware	26
		Railing	8

Work	Core Components	Parameters Looked at	No of Occurrences
	Toilet	Bathroom Floor Tiles	35
		Bathroom Wall Tiles	32
		Bathroom Floor Slope Not Maintained	1
Plumbing	Plumbing & Sanitary Works	Plumbing Fixtures	51
		Sanitary Fittings And Fixtures	31
		Pipe	0
Electrical	Electrical Works	Electrical	26

Analysis of number of flats having the defects indicates the following

Defects with incidence in more than 75 % of the flats inspected –

- *door hardware*

Defects with incidence in more than 50 % but less than 75 % of the flats inspected-

- *plumbing fixtures,*
- *grill door,*
- *window grill, mesh ,*
- *door shutter,*
- *dampness in wall*

Defects with incidence in more than 25 % but less than 50 % of the flats inspected –

- *bathroom wall tiles,*
- *bathroom floor tiles*
- *Ventilators*
- *Window frame*
- *Window shutter*
- *Door frames*
- *Cupboard*
- *Loft level*
- *Wall alignment and plumb*
- *Painting plastering and finishing*
- *Spout*

- *Floor tiles*

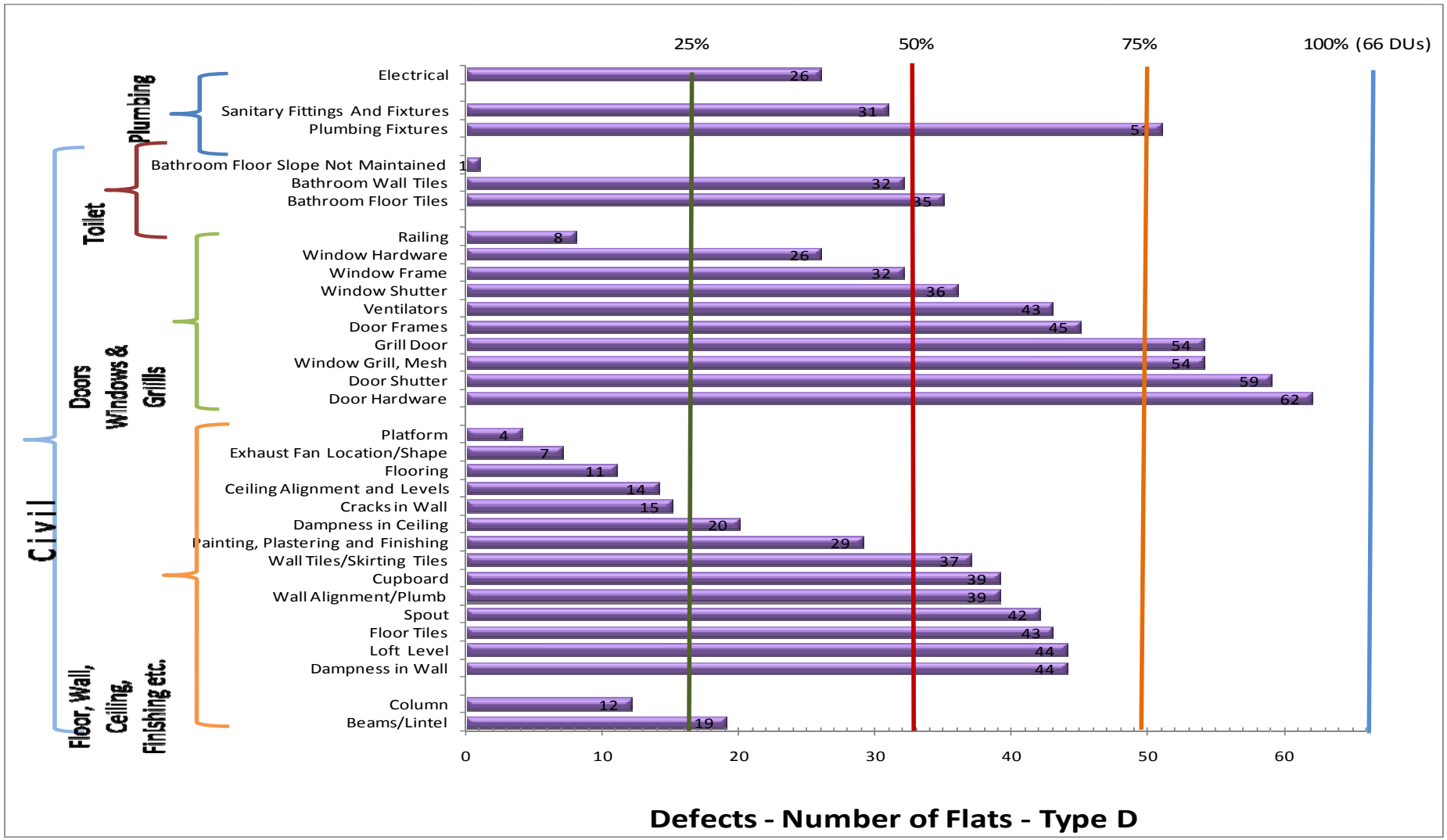
Defects with incidence in less than 25 % flats inspected –

- *Electrical*
- *Sanitary fixtures*
- *Railing*
- *Crack in ceiling*
- *Dampness in ceiling*
- *Ceiling alignment and levels*
- *Exhaust fan location and shape*
- *Cracks ion wall*
- *Flooring*
- *Column*
- *Beams/lintel*

Conclusion:

- Door hardware seems to have maximum amount of defects.
- The least occurrence of defects would be in elements such as column and beams wherein nearly 1 in 4 houses seem to have either a skewed column, undulating beam, column not being plumb etc.

The data capture sheets for all the flats inspected are appended as Annexure 1.1 in Vol. (III) of the report.


25%
50%
75%
100% (66 DUs)
Civil
Floor, Wall, Ceiling, Finishing etc,
Plumbing
Toilet
Doors Windows & Grills
Electrical
Sanitary Fittings And Fixtures
Plumbing Fixtures
Bathroom Floor Slope Not Maintained
Bathroom Wall Tiles
Bathroom Floor Tiles
Railing
Window Hardware
Window Frame
Window Shutter
Ventilators
Door Frames
Grill Door
Window Grill, Mesh
Door Shutter
Door Hardware
Platform
Exhaust Fan Location/Shape
Flooring
Ceiling Alignment and Levels
Cracks in Wall
Dampness in Ceiling
Painting, Plastering and Finishing
Wall Tiles/Skirting Tiles
Cupboard
Wall Alignment/Plumb
Spout
Floor Tiles
Loft Level
Dampness in Wall
Column
Beams/Lintel
26
31
1
32
35
8
26
32
36
43
45
54
54
59
62
4
7
11
14
15
20
29
37
39
39
42
43
44
44
12
19
0
10
20
30
40
50
60
Defects - Number of Flats - Type D

4.1.1.3 Photographs Individual Flats

Floor tiles

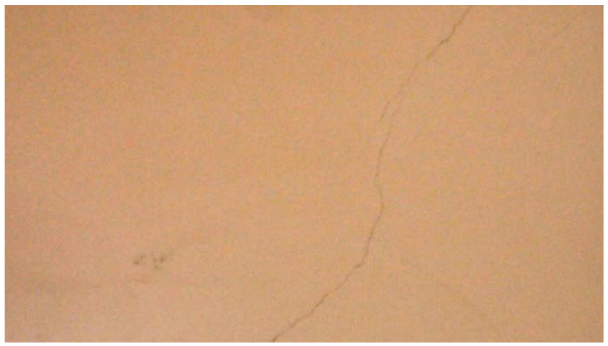
Beams/Lintel

Column

Cracks in wall



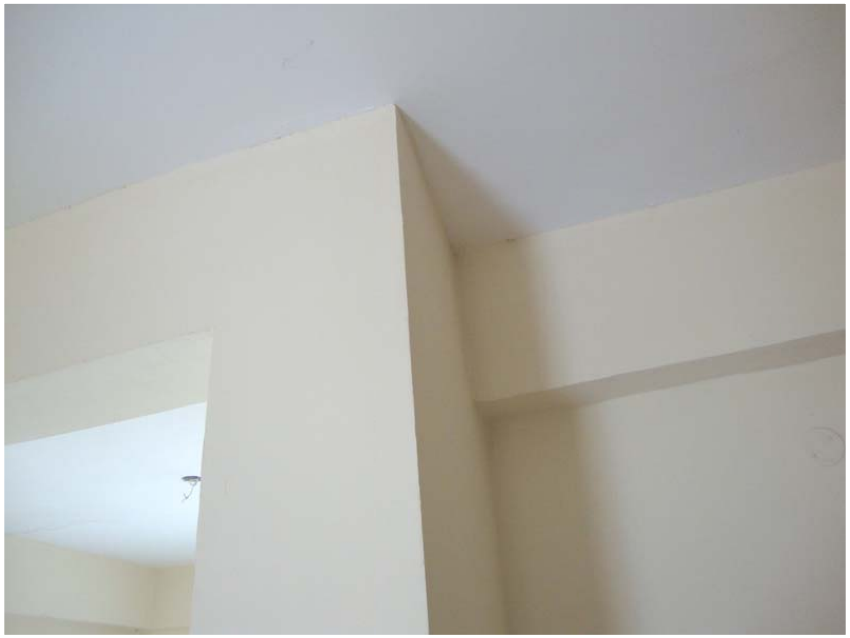





Dampness in wall

Painting, plastering and finishing

Walls skew/not plumb



Ceiling not horizontal/undulating/sloping

Dampness in ceiling






Door Frame

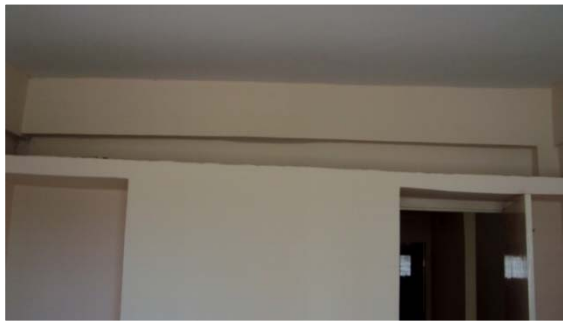
Door shutter

Window grill/mesh

Grill door

Ventilator

Loft not level



Cupboard

Sill not finished/not level

Loft not finished



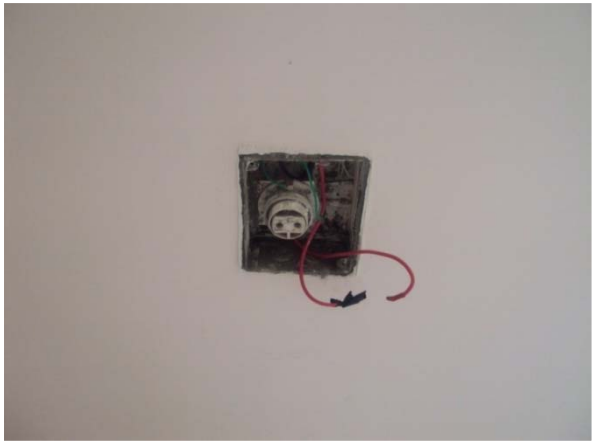



Plumbing fixtures

Sanitary fitting and fixtures

Bathroom tiles

Electrical



4.1.2 *Common Areas and amenities*

All the blocks was chosen for inspection of Common areas such as stilt areas, staircases, terraces, lifts and external surface of buildings were inspected for defects. Some of the common and repetitive defects as derived from the detailed inspection are indicated below as conclusion.

Conclusion

Stilt areas:

1. Columns are poorly aligned at many places.
2. Inadequate space for covered car parking and inadequate maneuvering space at many places.
3. Inadequate level difference between covered parking spaces and adjacent road surfaces.

Staircases:

1. Non-uniform riser in some flights.
2. Communication and power cable boxes not covered in some locations.
3. Handrails not been finished smoothly in most places.
4. Dampness in a few staircase head rooms, due to leakage in overhead water tanks.
5. Plaster Patches remains to be completed in a few blocks.

External surfaces of blocks:

1. External wall surfaces are not neatly plastered and painted in some places.
2. Drain pipes are not places / anchored to the wall in most places.
3. Poor alignment and incorrect joining of SCI pipes.

Terrace/roof top:

1. Water stagnation on the terrace due to undulations in most places.
2. Weather Proof course damaged and broken on most terraces which have been temporarily covered with sand and bitumen.
3. In certain blocks, expansion/construction joints are not sealed.

4. Construction waste material has been dumped on the terrace of some blocks.
5. Khurra not provided anywhere.
6. Overflow pipes from overhead water tanks are not connected to drain pipes.
7. Height of parapet walls ranges between 68 and 74 centimeters.

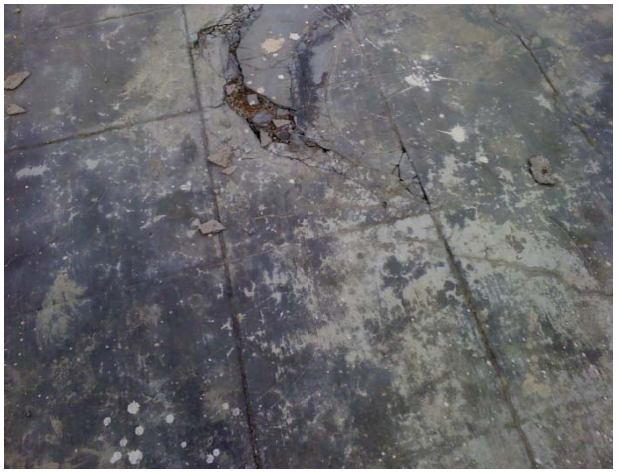
The data capture sheets of the blocks inspected are appended as Annexure 1.2 in Vol. (III) of the report.

4.1.2.1 Photographs Common Areas and amenities

Terrace : Surface finish damaged, Water stagnation, Inadequate height of Parapet wall





Terrace: Malba dumped & OTS not covered and overflow pipe (WT) not connected with drain pipe

Stilt : Columns not aligned and inadequate parking space

Stilt area: Floor sloping in the wrong direction

Leakages: Stilt, Staircase room and Water Tank

Leakages: Stilt, Staircase room and Water Tank

Leakages: Stilt, Staircase room and Water Tank

Communication and power cables not covered







Drain pipes: Not aligned/placed/anchored and Poor alignment/incorrect joining of SCI pipes

Staircase: Hand rails not covered / finished, Non Uniform riser and marble broken

Staircase room – RC door frame & Door broken, Steps width reduced, hand rails not covered.



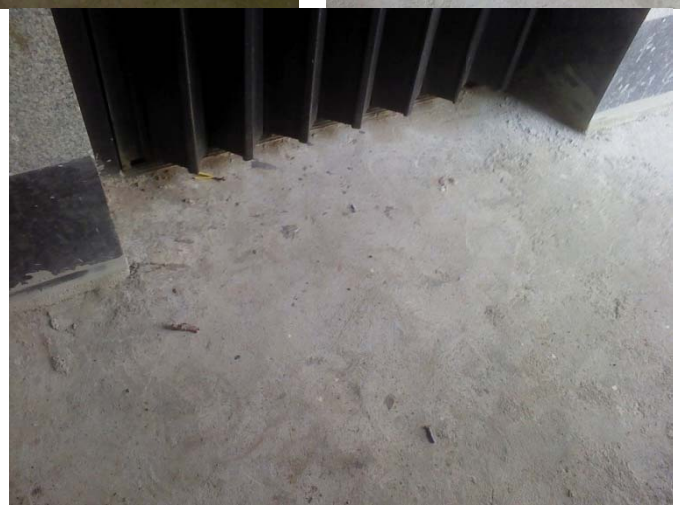




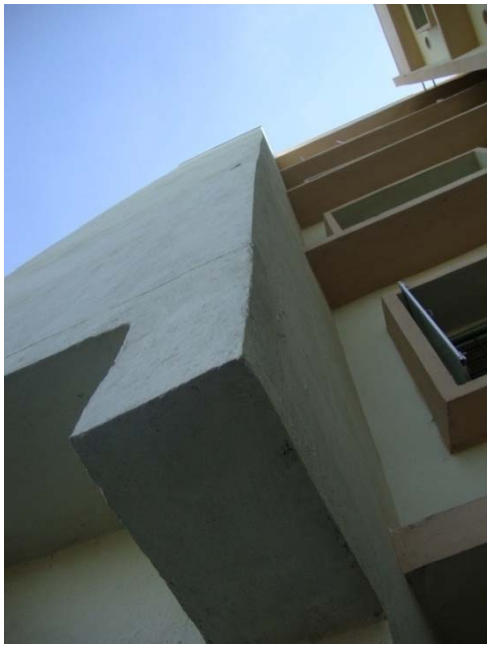

Lift: Door entry not finished and Inadequate level difference







External Wall: Dampness, Poor Alignment and wall surfaces not finished



Road with Storm water Drain: No Camber provided and Open drain with inadequate section

Expansion Joint: Not covered

4.1.3 *Development Works*

Inspection of development works such as Water supply, Waste Water Treatment Facility, Roads , Storm Water Drains Electrification was carried out based on visual inspection, design criteria and test reports furnished by CGEWHO and the inferences are as follows

Water Supply

- Water requirement is estimated by assuming 5 persons per flat & water demand @ 135 lpcd (excluding drinking water requirement). For drinking water, requirement is estimated @ 15 lpcd. The total requirement per day is 42,900 litres per day for drinking water & 3, 86,100 litres per day for other purposes.
- Source of water is bore wells provided within the site boundary.
- As per the yield report of bore wells, there is a requirement for 4 bore wells to meet the projected demand. However as additional safeguard, 8 number of bore wells have been dug. The bore wells are interconnected with level sensors and water from these bore wells are pumped to a centralized underground storage tank of 1, 96,000 litres capacity.
- As per the water quality report certified by Tamil Nadu Water Supply and Drainage Board dated 07.06.2005, the water is chemically potable.
- The water is treated through a system of RO plant, sand filter & Activated carbon filter. The treated water is stored in an underground sump of 42 cum capacity.
- Each block is provided with OHT of 20,000 litres capacity & the OHT has 2 compartments for storing drinking water & other purpose water separately. Water from the centralized underground storage tank & drinking water storage sump is pumped and distributed to the OHTs in all blocks. Monoblock pump of 10 lps at 45m head designed for 10 hrs of pumping for domestic purpose water & 6 lps at 45 m head designed for 2 hrs of pumping for drinking water (with 1 stand by) are provided.

- The distribution system is grid iron pattern with necessary isolation valves at junctions. As per the design calculations furnished, residual height available is more than the required head.

Waste water Treatment

- Sewage from all blocks flow to the collection tank by gravity and from there the sewage is pumped to the Fluidized Bio Reactor (*diffused aeration system*).
- In FBBR aeration system oxygen transfer takes place by molecular diffusion. The effluent from FBBR flows in to the clarifier. The settled sludge from the clarifier is transferred to anaerobic digestor. The overflow flow from the clarifier is treated in Pressure Sand Filter and then Activated Carbon Filter.
- The effluent is of reduced BOD (about 90% reduction), COD (about 80% reduction) & Total Suspended Solids (about 95% reductions). The effluent is used for gardening purpose.
- The plant is designed for a capacity of 350 cum per day. At present the sewage flow is only about 10% of the designed capacity. For operating the aeration system with the lesser inflow, the operating cost of the plant is high. At present the plant is being operated on a trial basis. Part of the sewage is being discharged in to nearby open area without any treatment.

Roads:

- Camber not provided in road surface.
- Paving surface is undulating which would result in water stagnation.
- Seal coat is already coming off in most places

Storm water drainage:

- Slopes to facilitate surface drainage are not provided in many places.

- Improper termination of rain water pipes from terraces.
- Open drain by the side of many roads are of inadequate section.

Electrification:

- Electricity power requirement of the project was been worked out taking into consideration common area lighting (Blocks, Sump Area, STP and Street lighting) requirement for lift and accordingly the total load requirement is 375.8KW. Considering diversity factor (0.7) and power factor (0.8) the total load is worked out as 328.825KVA.
- Three DG sets of 125 KVA have been provided to meet out the power back up for the above power demand.

Solid Waste Management:

- No Garbage Chutes are provided so as to avoid improper maintenance.
- Municipal Authorities shall take care of Door to door garbage collection system
- Main Garbage Bin outside the complex.

4.2 Specific Aspects:

- A random representative sample of four flats per type design (one in each floor), totaling to 16 flats was chosen for checking conformity to specifications as described in the contract document.
- Tables of observations showing items which do not conform to contract documents are given below.

4.2.1 *Work Specification Check (Flats)*

In respect of the adherence to tendered specifications all relevant clauses were analysed and some of them were found to be not conforming to the tender schedule. Some of the significant non-conformities are:

a. Precast RCC/CC Frames have been used instead of Pressed steel single rebated frames

b. Deviation from prescribed heights in respect of electrical fittings

c. PVC cistern instead of chinaware cistern.

The observation / inference on non-conformity of specification for 16 flats are tabulated and appended as Annexure 3.2.2 at Vol. (III) of the report.

4.2.2 *Work Specification Check (Common Areas and Amenities)*

The inference on The Non conformity of specification for 16 flats are tabulated and given here under.

S. No.	***Contract Clause No.***	**Schedule as Per Contract Agreement**	**Observations On As Executed At Site**
1	5.1.0	Plinth protection laid to slope shall be provided all round the building and be 50 mm thick and 610 mm wide	Some areas incomplete
2	5.1.0	Plinth protection laid to slope shall be provided all round the building with brick edging with C.M and using AC Sheet dividers and brush finishing the top surface	Not provided
3	6.2.0	Corbelling in masonry /RCC on walls ,below Chajjas,projections etc., and raised bands, cornices and perforated brick work in masonry shall be provided	Not provided
4	6.2.1	Brick work shall be projected at terrace level to form a raised brick band and cornice in two or more courses, all round the building	Not provided
5	6.2.2	Exhaust opening 350 mm dia RCC NP 2 class collar of matching size embedded in the same, surface finished with cement plaster and exterior fixed with wire mesh.	Exhaust opening of 300mm is provided and no wire mesh provision
6	7.3.4.2	PCC FLOORING IN SLITS shall be finished with floating coat on neat cement and a coat of cement slurry. Flooring shall be laid in rectangular panels of size not exceeding 1.2metre both ways with 4mm thick 40/50 mm wide dividing glass strips in between.	PCC Flooring in Stilts provided. However, size as specified and glass strips not provided.

S. No.	Contract Clause No.	Schedule as Per Contract Agreement	Observations On As Executed At Site
7	9.6.0	Railing shall be provided with wooden handrail on staircase	PVC Sheet on Steel Handrail is provided
8	9.8.0	Letter boxes shall be made out of injection moulded ABS Plastic of 305 x 260x 95 mm size with built in lock system of letter X make	Not provided
9	10.2.6	Khurahs shall be of size 45 cm x 45 cm unless specified in the description of item	Not provided
10	11.6.0	The pipes shall be thoroughly cleaned of any mortar droppings and painted with a coat of red primer and thereafter with 2 coats of ***Synthetic Enamel paint***	Not provided
11	12.5.3	All exposed /surface GI pipes shall be painted with 2 or more coats of Synthetic Enamel paint	Not provided
12	12.5.6	Each water tank shall have more than one down take, each down take pipe for not more than 4 DUs	Not provided
13	12.5.6	Over flow pipe from the water tank to be guided to nearest Khurrah	Not provided
14	12.5.7	GI pipes shall be laid on terrace embedded over cement concrete bed block of required size & 75 mm clear thickness provided at intervals of 2 meters and additionally at all bends	Not provided as per the specifications
15	12.7.1	All exposed pipes shall be painted with Synthetic Enamel paint	Not provided
16	12.7.2	Necessary sleeves and provisions for pipes crossing masonry and RCC shall be made for avoiding breakages	Not provided
17	12.7.2	Soil and waste water pipes shall not be less than ***100 mm dia.Vent pipe shall be provided for both soil and watse pipes***	Only soil pipe is in conformity
18	12.7.6	A 50 mm Sand cast iron vent pipe with terminal guard shall also be provided from the single branch connection at the last floor level up to terrace parapet level	Not provided
19	12.7.8	The PVC rain water pipes shall be laid on walls with a tee junction and access door at the terrace level to collect water from Khuraas	Provided without access door

S. No.	Contract Clause No.	Schedule as Per Contract Agreement	Observations On As Executed At Site
20	12.7.8	The vertical rain water pipe shall extend up to top of parapet and provided with a cowl	Not provided
21	12.7.8	15 cm x 15 cm cast iron grating shall be provided at the mouth in the pipe in the Khurah to discharge the rain water	Not provided
22	12.7.8.1	50 mm dia GI pipe sleeves projected 50mm beyond the face of the wall shall be provided	Not provided
23	12.7.9	All exposed SCI pipes shall be painted with synthetic enamel paint	Not provided
24	13.11.1c	Normally an earthing shall not be situated less than 1500 mm from the building	Provided at less than 1500 mm
25	19.7.0	Marking of parking areas in stilts and marked in white paint and numbered (Minimum parking area=18 sqm)	Not provided
26	19.9.0	Numbering of DUs -Numerals made of stainless steel of required size shall be fixed on the main door	Not provided
27	19.12.0	All units shall be required to be accessible directly through lift as well as staircase and shall also give back up Power supply through Diesel Generator	Provided

4.2.3 *Work Specification Check (Development Works)*

The observation / inference on Non conformity of specification the development works are tabulated and given here below.

Sl No.	Contract Clause No.	Schedule As Per Contract Agreement	Observations On As Executed At Site
1	5.1.1a	All pathways shall be laid using good quality interlocking cement concrete blocks duly approved by the Organisation	Provided only in Garden area

Sl No.	*Contract Clause No.*	**Schedule As Per Contract Agreement**	**Observations On As Executed At Site**
2	12.7.8	The rain water pipe shall be connected to the storm water drains and it shall not discharge the water in the open	Rain water pipe not connected to the storm water drain / ground water recharging chamber in many places, which lead to rain water flowing in the open.
3	17.1.2C	An arrangement for making connection with Municipal storm water chamber in future or existing chamber shall be provided	Not provided
4	16	Deep bore hole shall be dug shall be used as source of water and the water shall be into central underground tank	8 Nos. of bore wells & a centralized underground tank are available
5	16	Water shall be supplied to DUs after proper treatment through a Water treatment plant	The water is treated through a system of RO plant, sand filter & Activated carbon filter. The treated water is stored in a underground sump of 42 cum capacity and supplied to the flats for drinking purpose
6	16	Central Underground tank for storage of Water	Centralized underground tank of capacity 196 cum is provided
7	16	Quality of water whether potable or not	As per the Water Quality Report issued by Tamil Nadu Water Supply & Drainage Board dated 02.06.2005, ' The water is chemically potable & the water should be disinfected before it is used'
8	16.1.3	Scour valves and sluice valves are to be placed at the bottom of all depressions for emptying the main or letting out sediment	As per CGEWHO, necessary valves are provided for proper maintenance
9	17.1.2D	An integrated rain water harvesting system to be provided	Provided, however Improper termination of rain water pipes from terraces and rain water collection pits are covered with debris and are not of sufficient capacity
10	18.1.5	Open parking areas with Cement concrete Roads	Only BT Roads are provided
11	19.1.0	Arboriculture shall be provided in open area including landscaping etc	Some plantation and landscaping provided in a few demarcated open spaces only.

Sl No.	*Contract Clause No.*	Schedule As Per Contract Agreement	Observations On As Executed At Site
12	19.1.0	Tree guards shall be provided	Not provided
13	19.2.0	Boundary wall grill, Main gate ,Wicket gate shall be provided	Barbed wire is provided over compound wall instead of grill
14	19.2.0	Boundary wall of ***5 feet*** height plastered inside and outside with Boundary wall grill of ***3 feet height***	Only one side is plastered. Barbed wire is provided over compound wall instead of grill
15	19.4.0	Cattle trap shall be provided at the main gate	Not provided
16	19.6.0	Chequered tile paths shall be provided	Provided in some demarcated open spaces.
17	19.11.0	Sign boards and guide maps shall be put at various places	Guide maps not provided
18	19.16.0	Fire fighting works to be provided including pumps, water storage arrangements etc.,	Not provided
19		Community Facilities Such as Community Center ,Shopping complex, Bus shelter	Not provided
20		Pump house, Substation,	Sub Station not provided

4.2.4 *Product Make check*

The observation / inference on Non conformity of specification of product make is given here below.

S.No.	Items for which complaint received from Allottees	Brands provided	Adherence to brand specified in the Tender	Remarks
Civil				
1	Flush Doors	Gujran	No	Gujran Brand has not been specified in the Tender.
2	Iron Mongery	Brand not specified	No	Copy of invoice was not given by CGEWHO for verification
3	Locks	Godrej	Yes	
4	Glazed Tiles	Regency	No	CGEWHO vide letter 28.09.2012 has approved Regency as one of the brand for execution
5	Ceramic Tiles	Regency	Yes	

S.No.	Items for which complaint received from Allottees	Brands provided	Adherence to brand specified in the Tender	**Remarks**
6	Glass	Modi	Yes	
7	Aluminum Fittings (hardware)			
7.a	Window	Brand not specified	-	CGEWHO Vide letter dt 21st Jan 2013 stated that the item executed has been approved as per tender specification.
7.b	Doors and window fixtures	Nulite	Yes	
Sanitary				
8.a	Vitreous China ware	Cera	Yes	
8.b	Stainless Steel Sinks	AMC	Yes	
8.C	CP Fittings, Accessories & Valve	Othello	No	CGEWHO has approved Othello fittings for execution*.
8.d	CP Waste and Flush pipes	Cera	No	Instead of CP brass PVC pipe has been provided
8.e	Brass Stop and Bib cock	Othello	No	CGEWHO has approved Othello fittings for execution*.
8.f	PVC Cistern	Cera	No	As per tender cistern should be white vitreous china ware
Electrical				
9.a	MCB	Bentec	No	CGEWHO has approved Bentec MCBs for execution*.
9.b	Switches	Anchor	Yes	

4.3 Reply to Draft Report

केन्द्रीय सरकारी कर्मचारी कल्याण आवास संगठन
Central Government Employees Welfare Housing Organisation
(Ministry of Housing & Urban Poverty Alleviation, Govt. of India)

छठा तल, ए खण्ड, जनपथ भवन,
जनपथ, नई दिल्ली- 110 001
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No.T-109/17 March 8, 2013

Sh R D Padmakumar
General Manager (Projects)
Consultancy Wing
HUDCO
5th Floor, CMDA Tower 1
#1 Gandhi Irwin Road, Egmore
Chennai – 600 008.

Sub: Chennai Ph-II project – Quality Inspection Report

Sir,

Please refer to your letter no.HUDCO/CRO/CW/CA-22/2012-2013 dated 21.02.2013, wherein you have forwarded a draft report towards the third party quality inspection conducted by HUDCO as per CGEWHO's order dated 30.08.2013.

2. We must appreciate that through your best efforts, we could get complete quality assessment of the complex constructed. However, it is pertinent to mention here that the visual inspection of the DUs were carried out in most of the DUs prior to the elaborate rectification process as the flats available were in raw shape as constructed. As you have rightly pointed out in your report, CGEWHO has carried out rectification works which were noticed prior to handing over of the DUs and has also handed over 385 nos. of DUs out of 572 DUs to the beneficiaries satisfactorily till date. During the above action, CGEWHO has also tried its best to straighten the walls etc to the best possible way as well as finishing columns beams etc. to have a proper aesthetic aspect. With regard to the other activities, which are rectifiable, action has been taken towards achieving the desired end product to enable the beneficiaries take over the DUs in a satisfactory condition.

3. With regard to the inference of non conformity of specification as detailed in page 108 to 113 of Vol-I, it is to intimate you that the project has been taken up on a turnkey basis, wherein the scope of work includes transfer of land, complete planning, designing, obtaining approval from the organisation as well as statutory authorities towards construction of DUs, common facilities as well as development of all external services. The criteria towards execution of the project are limited to execution of the project to be done as per the drawings approved by CGEWHO as well as the statutory authority. The detailed planning has been done which has also been approved by CGEWHO prior to taking up the project. The tender documents issued with broad specifications were given considering all items normally being incorporated in a civil engineering project as no detailed planning of the project has taken shape at the time tendering.

Please visit us at www.cgewho.nic.in

Quote

The prices quoted shall be deemed to have included everything required for satisfactory completion of the work and due performances of the contract towards obtaining a fully functional complex as per scope and to the best intent of drawings, specifications and conditions of contract whether or not such requirements have been explicitly shown or stated or implied.

Unquote

Hence, the requirement as well as payment portion is not on an item rate basis and all activities have to be completed in total conformity of the drawings and individual reference of the specifications given as a comprehensive specifications is not having much reference other than basic specifications while executing the project as per the detailed drawing duly approved by CGEWHO. Hence, the specification as referred above are of a general nature and shall not have much bearing other than the activities are to be done from earth work excavation to handing over of the DUs as per the drawings and as per broad specifications to complete the project to a functional complex. Further, a detailed chart with regard to the points raised by you under clause 4.2.2 and 4.2.3 of the report is enclosed as Annexure.

Yours faithfully,

(M Narayanan)
Director (Tech)
For Chief Executive Officer

Encl: a.a

ANNEXURE

4.2.2 Work Specification Check (Common Areas and Amenities)

Sl No.	Contract clause no.	Schedule as per contract agreement	Observations on as executed at site	Comments
1	5.1.0	Plinth protection laid to slope shall be provided all round the building and be 50 mm thick and 610 mm wide	Some areas incomplete	Plinth protection has been provided in Type `A' block, where Ground Floor exist and all other blocks have stilts and no plinth protection is required. Stilt area is connected through small ramps from the bitumen roads.
2	5.1.0	Plinth protection laid to slope shall be provided all round the building with brick edging with C.M and using AC sheet dividers and brush finishing the top surface	Not provided	Necessary grooves as per the drawings have been provided.
3	6.2.0	Corbelling in masonry / RCC on walls below Chajjas, projections etc. and raised bands, cornices and perforated brick work in masonry shall be provided	Not provided	The elevation of the building has been done as per the approved drawings
4	6.2.1	Brick work shall be projected at terrace level to form a raised brick band and cornice in two or more courses, all round the building	Not provided	The work executed is as per the elevation drawings
5	6.2.2	Exhaust opening 350 mm dia RCC NP 2 class collar of matching size embedded in the same, surface finished with cement plaster and exterior fixed with wire mesh	Exhause opening of 300 mm is provided and no wire mesh provision	Present days, the smaller exhaust fans are being manufactured and the opening is provided to avoid any gap between the openings and the exhaust fan, the size has been determined as per the present day size of the exhaust fan., wherein the exhaust fans come along with louvers.

6	7.3.4.2	PCC FLOORING IN SLITS shall be finished with floating coat on neat cement and a coat of cement slurry. Flooring shall be laid in rectangular panels of size not exceeding 1.2 meter both ways with 4 mm thick 40/50 mm wide dividing glass strips in between.	PCC flooring in stilts provided. However, size as specified and glass strips not provided	Instead of glass, AC sheet strips were provided to avoid any damage while movement of the cars.
7	9.6.0	Railing shall be provided with wooden handrail on staircase	PVC sheet on steel handrail is provided	Since lift is provided in all DUs as well as there is a possibility of splash of rain water, it was decided to provide PVC sheet on hand rail in place of wooden handrail, as per drawings.
8	9.8.0	Letter boxes shall be made out of injection moulded ABS plastic of 305 X 260 X 95 mm size with built in lock of letter X make	Not provided	Letter box shall be provided on the verge of handing over of the common areas to avoid any pilferage as it is a loose item.
9	10.2.6	Khurahs shall be of size 45 cm X 45 cm unless specified in the description of item	Not provided	The necessary kurrah shall be provided on terrace while handing over of the common area
10	11.6.0	The pipes shall be thoroughly cleaned of any mortar droppings and painted with a coat of red primer and thereafter with 2 coats of Synthetic Enamel Paint	Not provided	The work is still to be done and shall be done at the time of handing over common area to Apartment Owners' Association.
11	12.5.3	All exposed / surface GI pipes shall be painted with 2 or more coats of synthetic enamel paint	Not provided	-do-
12	12.5.6	Each water tank shall have more than one down take, each down take pipe for not more than 4 DUs	Not provided	Provided as per the detailed water supply scheme finalized by the Consultant.

13	12.5.6	Over flow pipe from the water tank to be guided to nearest Khurrah	Not provided	Shall be provided
14	12.5.7	GI pipes shall be laid on terrace embedded over cement concrete bed block of required size & 75 mm clear thickness provided at intervals of 2 meters and additionally at all bends	Not provided	Instead of concrete block, masonry pillars of 1' 6" X 1' 6" has been provided @ 3 meter interval to avoid sagging of the pipes in addition to joints and bents.
15	12.7.1	All exposed pipes shall be painted with synthetic enamel paint	Not provided	Shall be done while handing over of the DUs.
16	12.7.2	Necessary sleeves and provisions for pipes crossing masonry and RCC shall be made for avoiding breakages	Not provided	Necessary sleeves / pipes were provided, wherever it is required as per the detailed drawings.
17	12.7.3	Soil and waste water pipes shall not be less than 100 mm dia, vent pipe shall be provided for both soil and waste pipes	Only soil pipe in on confirmity	Vent pipe has been provided as per the requirements
18	12.7.6	A 50 mm sand cast iron vent pipe with terminal guard shall also be provided from the single branch connection at the last floor level up to terrace parapet level	Not provided	Not required to be executed as per the sanitary details.
19	12.7.8	The PVC rain water pipes shall be laid on walls with a tee junction and access door at the terrace level to collect water from Khurrahs	Provided without access door	One of the two alternatives is to be provided.
20	12.7.8	The vertical rain water pipe shall extend upto top of parapet and provided with a cowl	Not provided	

21	12.7.8	15 cm X 15 cm cast iron grating shall be provided at the mouth in the pipe in the Khurah to discharge the rain water	Not provided	Shall be provided
22	12.7.8.1	50 mm dia GI pipe sleeves projected 50 mm beyond the face of the wall shall be provided	Not provided	Shall be dealt as per contract
23	12.7.9	All exposed SCI pipes shall be painted with synthetic enamel paint	Not provided	Shall be provided
24	13.11.1c	Normally an earthing shall not be situated less than 1500 mm from the building	Provided at less than 1500 mm	Provided within the space available
25	19.7.0	Marking of parking areas in stilts and marked in white paint and numbered (minimum parking area = 18 sqm)	Not provided	Shall be provided
26	19.9.0	Numbering of DUs – Numerals made of stainless steel of required size shall be fixed on the main door	Not provided	PVC number plates provided
28	19.14.0	Lightening arrestors to be provided	Not provided	Not required as per drawing
29	19.17.0	Garbage chutes with outlets at each floor to be provided in the block in case of configuration more than six storeys including shafts	Not provided	The garbage chutes to be considered for blocks having more than six storeys including stilt. The present project is in G +3 / Stilt + 4 configuration and hence chutes are not required and hence not provided.

4.2.3 Work specification check (Development works)

Sl No.	Contract clause no.	Schedule as per contract agreement	Observations on as executed at site	Comments
1	5.1.1a	All pathways shall be laid using good quality interlocking cement concrete blocks duly approved by the organization	Provided only in garden area	Provided as per the detailed drawing approved by CGEWHO
2	12.7.8	The rain water pipe shall be connected to the storm water drains and it shall not discharge the water in the open	Not provided	The rain water pipes have been provided according to the rain water harvesting bores to have a proper penetration.
3	16.1.1	Fire hydrants shall be provided	Not provided	The provisions have to be done as per statutory requirements only which does not stipulate fire hydrant for S + 4 configuration
4	16.1.2	Pump of required capacity with stand by arrangements shall be provided	Pumps for drinking water supply – 2 nos, 1 working, a standby, 10 lps at 45m head pump Domestic water supply – 2 Nos, 1 working, a standby, 6 lps at 45 m head	Pumps have been provided as per detailed design to cater the total need
5	17.1.2c	An arrangement for making connection with municipal storm water chamber in future or existing chamber shall be provided,	Not provided	According to the topography of the plot, the storm water have been discharged towards existing stream.
13	19.1.0	Arboriculture shall be provided in open area including landscaping etc.	Not provided	Proper landscaping has been done as per the drawings
14	19.1.0	Tree guards shall be provided	Not provided	Since it is a gated complex, there was no requirement of tree guards and hence not provided

15	19.2.0	Boundary wall grill, main gate, wicket gate shall be provided	Barbed wire is provided over compound wall instead of grill	CGEWHO have decided to go for concertina coil over the boundary wall to have a better security
16	19.2.0	Boundary wall of 5 ft height plastered inside and outside with boundary wall grill of 3ft height	Only one side is plastered. Barbed wire is provided over compound wall instead of grill	Both sides plastering has been done in all the boundary walls owning to CGEWHO. The adjoining boundary wall of other plot owning to them can only be painted on one side.
17	19.4.0	Cattle trap shall be provided at the main gate	Not provided	In modern time, cattle trap is not provided
18	19.6.0	Chequered tile paths shall be provided	Not provided	The paths have been provided s per the drawings only.
19	19.11.0	Sign boards and guide maps shall be put at various places	Guide maps not provided	The guide maps shall be provided while handing over of the area to the Association
20	19.15.0	D G sets with automatic switch over arrangement (in case of power failure) to cater for common areas lighting, street lights, only lift per block of DUs, water and sewage treatment plants to be provided with adequate sound proofing	3 nos. of DG sets of 125 KVA each are provided	DG sets as per the requirement
21	19.16.0	Fire fighting works to be provided including pumps, water storage arrangements etc.	Not provided	Provisions made as per the statutory requirement
22		Community facilities such as Community Centre, shopping complex, bus shelter	Not provided	The facilities shall be provided as per the approval of drawings by CMDA
23		Pump house, substation	Substation not provided	The transformers and other requirements were provided as per the TNEB requirements and TNEB has executed the project as per their approved scheme which cannot be changed to CGEWHO requirements.

4.4 Schedule of Modifications

4.2.2 Work Specification Check (Common Areas and Amenities)

Sl No.	Contract clause no.	Schedule as per contract agreement	Observations by HUDCO	Comments by CGEWHO	Modification in the Final Report
1	12.5.7	GI pipes shall be laid on terrace embedded over cement concrete bed block of required size & 75 mm clear thickness provided at intervals of 2 meters and additionally at all bends	Not provided	Instead of concrete block, masonry pillars of 1' 6" X 1' 6" has been provided @ 3 meter interval to avoid sagging of the pipes in addition to joints and bents.	Modified as: Not provided as per the specifications .
2	19.14.0	Lightning arrestors to be provided as per bye-laws of local plan approving authority	Not provided	Not required as per drawing	Modified: HUDCO's observation is dropped in the Final report
3	19.17.0	Garbage chutes with outlets at each floor to be provided in the block in case of configuration more than six storeys including shafts	Not provided	The garbage chutes to be considered for blocks having more than six storeys including stilt. The present project is in G +3 / Stilt + 4 configuration and hence chutes are not required and hence not provided.	Modified: HUDCO's observation is dropped in the Final report.

4.2.3 Work specification check (Development works)

Sl No.	Contract clause no.	Schedule as per contract agreement	Observations by HUDCO	Comments by CGEWHO	Modification in the Final Report
1	12.7.8	The rain water pipe shall be connected to the storm water drains and it shall not discharge the water in the open	Not provided	The rain water pipes have been provided according to the rain water harvesting bores to have a proper penetration.	Modified as: Rain water pipe not connected to the storm water drain / ground water recharging chamber in many places, which lead to rain water flowing in the open.
2	16.1.1	Fire hydrants shall be provided as per the local bye-laws	Not provided	The provisions have to be done as per statutory requirements only which does not stipulate fire hydrant for S + 4 configuration	Modified: HUDCO's observation is dropped in the Final report.
3	16.1.2	Pump of required capacity with stand by arrangements shall be provided	Pumps for drinking water supply – 2 nos, 1 working, a standby, 10 lps at 45m head pump Domestic water supply – 2 Nos, 1 working, a standby, 6 lps at 45 m head	Pumps have been provided as per detailed design to cater the total need	Modified: HUDCO's observation is dropped in the Final report.
4	19.1.0	Arboriculture shall be provided in open area including landscaping etc.	Not provided	Proper landscaping has been done as per the drawings	Modified as: Some plantation and landscaping provided in a few

					demarcated open spaces only.

5	19.6.0	Chequered tile paths shall be provided	Not provided	The paths have been provided s per the drawings only.	Modified as: Provided in some demarcated open spaces.

6	19.15.0	D G sets with automatic switch over arrangement (in case of power failure) to cater for common areas lighting, street lights, only lift per block of DUs, water and sewage treatment plants to be provided with adequate sound proofing	3 nos. of DG sets of 125 KVA each are provided	DG sets as per the requirement	Modified: HUDCO's observation is dropped in the Final report.