



महाराष्ट्र शासन

नगर विकास विभाग, मंत्रालय, ४ था मजला, मादाम कामा रोड,  
हुतात्मा राजगुरु चौक, मुंबई ४०० ०३२.

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क्रमांक : अपिल/टिपीबी-४३२५/१५९१/प्र.क्र.१२२/२०२५/नवि-११

दिनांक :- २०/०८/२०२५

प्रति,

१. आयुक्त, सर्व संबंधित महानगरपालिका
२. महानगर आयुक्त, सर्व संबंधित महानगर प्रदेश विकास प्राधिकरणे
३. सर्व संबंधित जिल्हाधिकारी
४. मुख्याधिकारी, सर्व संबंधित नगरपरिषदा / नगरपंचायती
५. सर्व विशेष नियोजन प्राधिकरणे
६. सर्व नवनगर विकास प्राधिकरणे
७. व्यवस्थापकीय संचालक, सिडको, सिडको भवन, सीबीडी बेलापुर, नवी मुंबई
८. उपाध्यक्ष तथा व्यवस्थापकीय संचालक महाराष्ट्र राज्य रस्ते विकास महामंडळ, मुंबई.

विषय:- उंच इमारतींच्या बांधकामध्ये उंचीवर काम करताना घ्यावयाचे दक्षतेबाबत विशेष सुरक्षा नियंत्रण मार्गदर्शक सूचना (Special safety Control Guidelines).

महोदय,

वरील विषयाचे अनुषंगाने मार्गदर्शन सूचना (Guidelines) यासोबत निर्गमित करण्यात येत आहेत. त्यानुसार संबंधितांनी आवश्यक उचित कार्यवाही करण्यात यावी, असे आपणांस कळविण्याचे मला आदेश आहेत.

आपला,

( निर्मलकुमार चौधरी )

उप सचिव, महाराष्ट्र शासन

सोबत :- वरीलप्रमाणे.

प्रत :-

- १) संचालक, नगर रचना, महाराष्ट्र राज्य, पुणे.
- २) सह संचालक, नगर रचना, कोकण / पुणे/अमरावती/ औरंगाबाद/ नाशिक/ नागपूर विभाग.
- ३) उपसंचालक, नगर रचना, नागरी संशोधन घटक, पुणे.
- ४) सह सचिव तथा संचालक, नगर रचना यांचे स्वीय सहाय्यक, नगर विकास विभाग, मंत्रालय, मुंबई.
- ५) अवर सचिव, (नवि-१३) नगर विकास विभाग, मंत्रालय, मुंबई.
- ६) निवडनस्ती, (नवि-११).

‘उंच इमारतींच्या बांधकामध्ये उंचीवर काम करताना घ्यावयाचे दक्षतेबाबत’ शासन नगर विकास विभागाकडील पत्र क्र. टिपीबी-४३२५/१५९१/प्र.क्र.१२२/२०२५/नवि-११, दि.२०/०८/२०२५ सोबतच्या मार्गदर्शक सूचना (Special safety Control Guidelines)

प्रस्तावना :-

उंच इमारतींचे बांधकाम चालू असताना उभारण्यात येणाऱ्या झुलत्या क्रेन (Suspended Crane) इत्यादी यंत्रणांबाबत योग्य ती खबरदारी न घेतल्याने, बांधकाम चालू असताना त्यामधून उंचीवरून काही वस्तु खाली पडून अपघात होत असल्याच्या घटना होत असल्याने यासंबंधी मे.लोखंडवाला रेसिडेन्सी को. ऑप हौसिंग सोसायटी लि. यांनी बृहन्मुंबई महानगरपालिका व इतर यांचे विरोधात मा. उच्च न्यायालय, मुंबई येथे दाखल केलेल्या रिट याचिका (लॉ) क्र. ५६२७/२०२३ मध्ये मा. उच्च न्यायालयाने दि. १/०३/२०२३ रोजी सुनावणी दरम्यान अशा घटनांमुळे होत असलेल्या अपघातांबद्दल गंभीर चिंता व्यक्त करण्यात आली. अशा घटनांमुळे निष्पाप लोक जखमी होती किंवा त्यांचे प्राण जातील अशा गोष्टी भविष्यामध्ये न घडण्याच्या अनुषंगाने सदर रिट याचिकेमध्ये मा. उच्च न्यायालयाने दि. १/०३/२०२३ रोजी आदेश पारीत केले असून, सदर आदेशानुसार, उंच इमारतींचे प्रकल्पामध्ये बांधकामाकरीता क्रेन यंत्रणेचा वापर करतेवेळी घ्यावयाचे दक्षतेच्या अनुषंगाने सुरक्षा निकष (safety norms) तयार करण्याकरीता सदर आदेशाचे परिच्छेद १३ मध्ये नमूद असल्याप्रमाणे ‘तज्ञ समिती’ गठीत करण्याबाबत आदेश देण्यात आले आहेत.

त्यानुसार गठीत तज्ञ समितीने सादर केलेला अहवाल/ मार्गदर्शक तत्वे शासनाने स्विकारून त्या अनुषंगाने अंमलबजावणी करीता नियोजन प्राधिकरणे/ महानगरपालिका यांना योग्य ते निर्देश पारित करण्याबाबत मा. उच्च न्यायालयाने दि. १२/०८/२०२५ रोजी आदेश दिले आहेत.

मा. उच्च न्यायालयाचे दि. १/०३/२०२३ रोजीच्या आदेशाच्या अनुषंगाने गठीत तज्ञ समितीने दि. ०२/०१/२०२५ रोजी सादर केलेला अहवाल (Special safety Control Recommendation for working at heights during the High Rise Construction) मा. उच्च न्यायालयाचे दि. १२/०८/२०२५ रोजीचे आदेशास अनुसरून सदर आदेशात नमूद केल्याप्रमाणे समितीच्या अहवालातील परिच्छेद ८, ९, १० मधील सुधारणेसह शासनाने स्विकारला आहे. त्यानुसार खालीलप्रमाणे मार्गदर्शक सूचना देण्यात येत आहेत:-

### मार्गदर्शक सूचना

सुरक्षा तज्ञ समितीने उंच इमारतींचे बांधकामात उंचीवर होत असलेल्या विविध कृतींचा आढावा घेऊन त्यावेळेस होऊ शकणाऱ्या दुर्घटना विचारात घेऊन साकल्याने सुरक्षेसाठी खालील मुद्द्यांवर विस्तृतपणे शिफारसी त्यांचे अहवालात केलेल्या आहेत.


- 1) Recommendation to appoint a Safety Officer
- 2) Recommendations for Crane Operations
- 3) Recommendations for Façade and Other Installations at height
- 4) Recommendations for Safeguarding Adjacent Areas
- 5) Building Proposal IOD Conditions Related to Working With Cranes



सुरक्षा तज्ञ समितीचा अहवाल शासनाच्या नगर विकास विभागाच्या वेबसाईट [www.maharashtra.gov.in](http://www.maharashtra.gov.in) (Acts/Rules) वर उपलब्ध करून देण्यात आलेला आहे.

सुरक्षा तज्ञ समितीने उंच इमारतींच्या बांधकामामध्ये उंचीवर काम करण्याच्या अनुषंगाने समितीचे अहवालात नमूद केलेल्या शिफारशी, प्रतिबंधक उपाययोजना सह मा. उच्च न्यायालयाचे दि.१२/०८/२०२५ रोजीचे आदेश विचारात घेऊन त्या अनुषंगाने काटेकोरपणे अंमलबजावणी करण्याबाबत आवश्यक कार्यवाही करण्यात यावी.



  
(निर्मलकुमार चौधरी)  
उप सचिव, महाराष्ट्र शासन



**Report of the Expert Safety Committee  
Special Safety Control Recommendations for Working at  
Heights During High Rise Construction**

# Report of the Expert Safety Committee Special Safety Control Recommendations for Working at Heights During High Rise Construction

This report has been prepared with contributions from the following committee members.

1.



**Mr. Amol Shetgiri**  
*(Nominated by Hon. Bombay High Court)*  
*M. Arch (Hons), MFSM, FIV, MISSE*  
*Managing Partner, M/s SHETGIRI & ASSOCIATES*  
*(A Firm working as Design Consultants for*  
*many of the prominent projects across India)*

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2.



**Mr. P. G. Redekar**  
*(Nominated by Hon. Bombay High Court)*  
*F.I.I.V., M.I.C.A., Chartered PMC,*  
*Chartered CMC, Certified Arbitrator,*  
*Approved Valuer, RICA Global*

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3.



**Mr. Roshan Bhoir**  
*(Representative of MCGM)*  
*M.E.(Structure)*  
*Assistant Engineer (Building Proposal) City, MCGM*

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4.



**Mr. Vikraman Pillai**  
*(Representative of the petitioner)*  
*MS Civil Engineer (USA),*  
*MBA from Jaipur University.*  
*Project Director for one of the Tallest Building in Country*

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5.



**Adv. Mridul Sharma**  
*(Representative of the petitioner)*  
*(Solicitor) practitioner of Bombay High Court*  
*and Supreme Court of India*

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6.



**Dr. Shashank Mehendale**  
*(Nominated by Respondent No. 2)*  
*Structural Engineer*  
*Member High Rise Committee*  
*Member Heritage Committee*

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7.



**Girish Dravid**  
*(Nominated by Respondent No. 2)*  
*Structural Engineer*  
*Chairman-Council on Tall Buildings and*  
*Urban Habitat India*  
*Member ERP, MCGM*

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**Report of the Expert Safety Committee  
Special Safety Control Recommendations for Working at Heights  
During High Rise Building Construction**

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# Preface

The city of Mumbai is growing taller. With its peculiar geographical characteristics and its attraction as a city of dreams, the ever increasing population can only be accommodated in buildings growing taller and taller with the passage of time. The Mumbai building developers and contractors have adopted modern advanced technologies that have facilitated the tall building construction very effectively. Mumbai now boasts of having many buildings above 100 m, 181 buildings above 150 m, 47 buildings above 200 m and 24 buildings above 250 m. The tallest building at the time of submitting this report is Lokhandwala Minerva that stands at 301.60m as per Civil Aviation NOC. Another 416 buildings are under construction having approvals from authorities with more than 150 m height rising to 331 m at its maximum. There is a news of a project with 400 m height in proposal. Apart from this, more than 4000 high rise buildings have been built less than 150 m in height. These buildings also come under the ambit of this report, where cranes are installed for facilitating construction.

(Source : Wikipedia : List of Tall Buildings in Mumbai - sourced on 07-05-2024)

While the construction technology of tall buildings has been very well absorbed by the city's construction industry, there have been cases of negligence and violation of safety measures by builders/developers/contractors. There have been records of various mishaps and accidents. It is pertinent to note that there is a lack of rules/regulations and/or notifications regarding accidents that are specific to high-rise construction. In multiple cases it is also observed that the Adjacent Plot and/or nearby area/adjacent area like roads, gardens, parking of the said construction site are affected by incidences such as falling debris and gravel, collision, and breakages of construction equipment etc. Such incidents continue to endanger premises and the lives of adjacent residents and pedestrians on adjacent roads.

A few accidents took place in Mumbai in 2022 and 2023 which were tower crane related incidents, which affected innocent passing by pedestrians near high-rise construction sites.

**Senior citizen dies in Mahim after iron feeder falls on her**  
Richa Pinto / TNN / Updated: Aug 27, 2023, 11:37 IST

**New For You**

A 63-year-old Mahim resident died on Friday after an iron feeder tray from an under construction site fell on her while she was returning home from the local market in the area. The deceased identified as Irene Rodrigues, lived in Kapad Baz ...[Read More](#)




The woman was taken to Sion hospital where she was declared dead by the doctor on duty

5 Indian cities named in the "Best Food Cities in the World"

Spl cams to keep eye on storm drains at Capitol

What lies ahead for Jyotiraditya Scindia and his team?

**At least 20 die after crane collapses at India highway construction site**  
*At least 20 killed and three admitted to hospital with injuries after accident in the Thane region of Maharashtra state.*



This handout photograph taken on August 1, 2023 and released by members of India's National Disaster Response Force shows the site of the accident at the under-construction Samruddhi Expressway (NDRF/AFP)

1 Aug 2023 | Updated: 1 Aug 2023 04:55 PM (GMT)

On February 14, 2023, an accident occurred at a residential construction site, where concrete blocks fell from 42<sup>nd</sup> floor on to an adjacent road, killing two pedestrians instantly. Occupants of the adjoining building had experienced similar but of lesser intensity falls of other construction material and debris from the same building during its construction over past couple of years. The fatal accident prompted the residents of the adjoining building to file a writ petition prompting the Bombay High Court to issue an order on March 9, 2023.



904.WPL5627\_2023.DOC

**IN THE HIGH COURT OF JUDICATURE AT BOMBAY  
ORDINARY ORIGINAL CIVIL JURISDICTION**

WRIT PETITION (L) NO. 5627 OF 2023

Lokhandwala Residency Towers Cooperative ... Petitioner  
Housing Society Ltd.

*Versus*

The Municipal Corporation of Greater ... Respondents  
Mumbai & Anr.,

Mr. Prateek Seksaria, Senior Advocate, Mr. Prathamesh Kamath, Mr. Nakul Jain, Mr. Yash Chheda, Mr. Rohit Agarwal, Mr. Mridul Sharma, Ms. Poonam Shrivastav, Mr. Atul Umekar, Ms. Saakshi Saboo i/b. M.S. Legal (Advocates & Solicitors (UK)) for the petitioner.

Mr. Narendra V. Walalwalkar, Senior Advocate a/w. Ms. Vandana Mahadik for respondent no. 1.

Mr. Pramod Bhosale, SEPB (U/S) Ward present.

Mr. Zal Andhyarujina, Senior Counsel, Mr. Karan Bhide, Mr. Dhawal Mehta, Ms. Tanvi Shah i/b. Wadia Ghandy & Co. for respondent no. 2.

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CORAM: G. S. KULKARNI  
& R.N. LADDHA, JJ.  
DATED: 09 March, 2023

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The writ petition aimed at bringing up the “issues in regard to the safety measures to be adopted in the construction of super high-rise buildings and more particularly of the nature they are coming up in the contemporary times.”

The Bombay High Court Bench observed that they were “deeply pained to note such incident, they hoped that none of the high rise constructions in the city of Mumbai should make people vulnerable and prone to such accidents, in which innocent people would get hurt or lose their lives. They firmly believed that a right of a person to move freely, in places which are not actual constructions sites, if are threatened by a fear of being killed or hurt, this would certainly amount to violation of one’s fundamental right to livelihood, guaranteed under Article 21 of the Constitution.” (*para 9, BHC Order dt. 09 March 2023*)

The bench observed that the constructions of such nature being specialized, seemed to be routinely undertaken by use of large cranes hanging/suspended in the air. It wanted the Municipal Corporation to give special attention to the safety requirements in this regard. Points regarding statutory control over agencies responsible for erecting and operating the cranes, their certification, norms of safety and precautions etc. were raised by the bench so that the use of cranes do not affect those who are outside the construction site, i.e. in the adjoining land/premises or on the public road, in the vicinity.

*(para 11 BHC Order 09 March 2023)*

The High Court Order directed the formation of a committee comprising of Mr. Amol Shetgiri, Mr. P.G.Redekar, a Senior Technical Officer to be nominated by the Municipal Commissioner, two representatives of the petitioner and two representatives of the developer in whose site the crane was located at the time of the fatal accident: *(para 13(i) BHC Order 09 March 2023).*

It further directed that “..... the Municipal Corporation shall look into issues interalia concerning safety measures in the operation and use of cranes in high rise constructions, including after having inputs of its representative being nominated by the Municipal Commissioner on the said Committee .....” *(Para 13(v) BHC Order 09 March 2023)*

The bench further expected that when the “Municipal Corporation formulates the guidelines and intends to issue appropriate directives, the Urban Development Department ..... Shall act upon any such proposal of the Municipal Corporation with utmost expediency.” *(para 15 BHC Order 09 March 2023)*

Accordingly, a committee was formed under th BHC Order dt. 09 March 2023 consisting of:

- |                           |   |                                     |
|---------------------------|---|-------------------------------------|
| 1. Mr. Amol Shetgiri      | - | Nominated by Hon. Bombay High Court |
| 2. Mr. P. G. Redekar      | - | Nominated by Hon. Bombay High Court |
| 3. Mr. Roshan Bhoir       | - | Representative of MCGM              |
| 4. Mr. Vikraman Pillai    | - | Representative of the petitioner    |
| 5. Adv. Mridul Sharma     | - | Representative of the petitioner    |
| 6. Dr. Shashank Mehendale | - | Nominated by Respondent (No. 2)     |
| 7. Mr. Girish Dravid      | - | Nominated by Respondent (No. 2)     |

The committee commenced their proceedings on 31<sup>st</sup> March 2023. Through a span of approximately twelve months, after various deliberations, research and studies, this report has been compiled with consensus.

The Committee expects that enforcing the suggestions and recommendations given in this report will significantly minimize the incidences of accidents caused by operations of cranes and falling objects during the construction of High-Rise Buildings and associated damage / loss of life and property of persons not connected (and also connected) with the construction of the High-Rise Projects in the city.

It is to be expressly noted that this study is based on literature and records available to the committee and that it has been conducted for incidents and accidents that have been reported and of the known types.

The committee wishes to thank Hon. Bombay High Court for selecting the members to prepare a document which will be used as a safety guideline in the City of Mumbai in the construction of High-Rise buildings. The members have considered this opportunity to serve the city and its public as a citizen's duty and have contributed their respective expertise in formulating the contents of this report to the best of their ability.

The committee thanks the management of Provenance Land Co. for making their premises available for holding the meetings periodically and also to provide necessary hardware, software and internet support for online meetings.

# Abbreviations

Abbreviations used in this report have been listed here for the convenience of readers for clarity.

<b>Abbreviation</b>	<b>Definition</b>
ACD	Anti Collision Device
AHU	Air Handling Units
ASLI	Automatic Safe Load Indicator
ASME	American Society of Mechanical Engineers
BHC	Bombay High Court
BMC	Brihan Mumbai Municipal Corporation
BOCW	Building and Other Construction Workers' (Act)
BP	Building Proposals Department
BS	British Standards
BS EN	British Standard considered as European Standard
CDM	Construction, Design and Management (Regulations)
CLI	Central Labour Institute
Co.	Company
dt.	Dated
etc.	<i>et cetera (latin)</i> ; "and others", "and the rest"
HK	Hong Kong
Hon.	Honorary
HVAC	Heating, Ventilation and Air Conditioning
i.e.	<i>id est (latin)</i> ; "in other words", "that is to say"
IOD	Intimation of Disapproval
IS Code	Indian Standards Code
ISO	International Organization for Standardization
kg, Kg	Kilogram
LOLER	Lifting Operations and Lifting Equipment Rgulations
LSO	Licensed Safety Officer
m	meter, meters
MCGM	Municipal Corporation of Greater Mumbai
MEP	Mechanical, Electrical and Plumbing
NOC	No Objection Certificate
NSE	Non Structural Elements
OH&S	Occupational Health and Safety
PA	Planning Authority
para	paragraph
PFAS	Personal Fall Arresting System
RCC	Reinforced Cement Concrete
RLI	Regional Labour Institute
sq.m, Sq.m, sq.M.	Square Meter

# Records of the Safety Committee Meetings

Periodic meetings of the Safety Committee began on 17<sup>th</sup> March 2023. All seven members of the Safety Committee were present. The committee members were apprised with the Hon'ble Bombay High Court Order dated 9<sup>th</sup> March 2023 passed by His lordships Shri. G.S. Kulkarni J. and Shri. R.N. Laddha J. It was decided to discuss the framework of the committee report at length for the formulation of the policy/norms as guided by the Hon'ble Bombay High Court in Order dated 9<sup>th</sup> March 2023. The committee members agreed to prepare a specific agenda for each meeting. Meanwhile any present case, judgment, law, rules/regulations and/or notifications known to any committee member was decided to be shared in the committee so that the same can be read thoroughly before attending the next meeting.

Accordingly, in the meeting dt. 24<sup>th</sup> March 2023, Mr. Vikraman Pillai & Mr. P G Redekar circulated the IS code 13367 pertaining to safety norms during usage of Tower Crane & OH&S documented information for erection, operation & dismantling of Tower crane.

The contents of IS 13367 Part 1 1992 were read & discussed. The IS Code is quite elaborate & covers major aspects related to crane safety. The committee noted that the said code has Parts 2 to 10. Since Part 4 covers Tower Cranes, it was decided that the committee would peruse Part 4 of the said code in subsequent meetings. The committee members after perusing the document that is OH&S documented information for erection, operation & dismantling of Tower crane, felt that the same may be read with Part 4 of IS 13367.

During the discussions it was interestingly revealed that the requirement of Safety Officers to be deputed on site, though insisted by Planning Authority during the Plan approval process, the role, responsibilities, qualification & licensing policy is generally not spelled out in the IOD/approval granted by such authorities.

On 31st March 2023 Dr. Shashank Mehendale circulated copy of Code of Practice for Safe Use of Tower Cranes by Occupational Safety & Health Branch, Labour Department - HK. The said code provides for appointment of safety officer as well as Safety Supervisor.

Prominent clauses in all the codes related to Tower cranes dealt with clearances from the nearby obstacles. The committee took note of this, although an incident involving clashes with nearby buildings or obstacles has so far not been reported.

The trigger for formation of the current committee was of course the recent incidences of falling objects. On this background, BS-7121 Part 5 of 2019 published on 30<sup>th</sup> Sept 2019 along with various other updates includes recommendation on preventing objects falling from Tower Crane becomes pertinent.

Mr. Amol Shetgiri shared Workplace Health & Safety Queensland- Office of Industrial Relations Tower Crane Code of Practice 2017 issued by the Minister for Employment & Industrial Relations Queensland- Australia. Referring to **clause 5.4 (attached as annexure 3)** of the said code which deals with minimizing the risk of injury from falling objects, the committee felt that relevant provisions should be incorporated in the final recommendations. Furthermore, any other clause mentioned in the above code shall be duly considered by the committee for final recommendation.

After deliberations a schematic protection system where crane boom extends beyond the plot was conceptualized and a sketch was prepared. This forms a part of the recommendations to MCGM. The committee recommends this sketch to be a condition in the approval process for all construction projects under MCGM jurisdiction.

In the meeting dt. 22<sup>nd</sup> May 2023, the complete framework of the report was decided. The broad layout was arrived at as follows.

- 1) Preface to include literature summary
- 2) Observations/Technical findings (during erection, operation, natural disasters like cyclone, earthquake)
- 3) Case study on Zero incidence sites
- 4) Suggestions & recommendations (Regulatory + Technical part)

It was also decided in the same meeting that a few Crane manufacturers /Operators would be called for discussions & presentations in order to come out with additional innovative points to be captured in the report.

In the next four months, the committee met for finalization of the format and content of the report.

### **Site Visits**

Committee members visited various Highrise building construction site and studied the safety precautions implemented at site and collected the information about the tower crane Installation, operations & maintenance happening at site and also preventive measures taken by the project proponent/contractors, which form part of the recommendations made in the following pages.

The minutes of all the meetings held by the committee are attached in Annexure 6.

# Recommendations Made to MCGM – Synopsis

Through the following chapters, certain recommendations have been made to the Building Proposal Department of the Municipal Corporation of Greater Mumbai to insist on documentation related to inspection and maintenance records of the cranes, its operations and its operators at various stages of the work. These, if implemented, will keep a tab on the works executed using cranes to ensure disciplined and safe working procedures. The committee believes that mishaps that have so far been recorded in which innocent unrelated members of the public and adjoining properties have suffered, sometimes causing loss of life and property, will be reduced in numbers and in their intensity if these recommendations are followed.

The recommendations are primarily on the quality and technological advancement of the cranes used, qualifications of the personnel involved in the crane operations, assigning a one point responsibility on a key person identified as a Licensed Safety Officer, enforcing periodic preventive measures through inspection and regular maintenance and guidelines, assigning responsibility of shielding the adjacent premises and surrounding public roads with the task of erecting protective arcades and protective nets while carrying out methodical and disciplined crane operating procedures.

For detailed description of the activities that are normally carried out at heights, hazards ensuing out of the construction activities at heights, qualifications of the personnel, mitigation measures and documentation requirements, see the chapters 1 to 7 following this synopsis.

Important measures to protect the adjoining areas and the workers and equipment in the plot under construction are graphically shown in Chapter 7. These are described in the recommendations to the Building Proposal Department in this Chapter as the IOD conditions to be imposed.

# Chapter 1:

## Activities at height involved in High Rise Construction

Construction activities conducted at height in a high-rise building typically involve a range of tasks necessary for the erection, maintenance, and completion of the structure. Here are some common activities:

1. **Steel Erection:** Erecting the steel framework of the building involves working at height to assemble and connect structural steel beams, columns, and other components.
2. **Concrete Formwork:** Installing formwork for concrete pouring at various levels of the building requires workers to operate at height to set up and dismantle forms for walls, columns, and slabs.
3. **Facade Installation:** Installing the facade elements such as glass panels, cladding, and curtain walls often requires workers to access elevated areas using scaffolding, aerial lifts, or suspended platforms.
4. **Window Installation:** Fixing windows and glazing systems involve working at height both internally and externally to install and seal windows properly.
5. **Mechanical, Electrical, and Plumbing (MEP) Installation:** Installing HVAC systems, electrical wiring, plumbing pipes, and other MEP components involves working at height to route and connect utilities throughout the building.
6. **Concrete Pouring:** Pouring concrete for floors, slabs, and decks requires workers to operate at various heights using cranes, placer booms, elevated work platforms, or scaffolding.
7. **Finishing Work:** Applying finishes such as paint, drywall, flooring, and ceiling systems may require workers to access elevated areas using ladders, scaffolding, or aerial lifts.
8. **Roofing:** Installing roofing materials, such as membranes, shingles, pre-cast panels or tiles, involves working at height to cover and seal the building's roof.
9. **Structural Inspections and Maintenance:** Conducting inspections, repairs, and maintenance tasks on the building's structure and facade often requires workers to access elevated areas using specialized equipment and safety harnesses.
10. **Safety Measures:** Implementing safety measures such as installing guardrails, safety nets, and personal fall protection systems, enclosed safety platforms, safety protocols and fitness certification for various equipment used in the building to ensure the safety of workers operating at height.

These activities are typically performed by trained personnel equipped with appropriate safety gear and following strict safety protocols to mitigate the risks associated with working at height in a high-rise construction environment.

When conducting activities at height in high-rise building construction, there are several hazards that can pose risks to adjacent properties and pedestrians. Some of these activities that can be the cause of mishaps include:

1. **Material Handling:** During construction, materials such as concrete, steel beams, and glass panels are often lifted to upper floors using cranes or hoists. Improperly secured loads or equipment failure can lead to materials falling from height, posing a risk to nearby properties and pedestrians below.
2. **Debris and Dust Management:** Construction activities generate a significant amount of debris and dust, which can be blown off by wind or displaced during demolition or installation processes. Proper containment measures such as netting, scaffolding enclosures, or screens should be in place to prevent debris from falling onto adjacent properties or pedestrians.
3. **Scaffolding and Formwork:** Improperly erected scaffolding or formwork can collapse, causing objects to fall from height. Regular inspections and maintenance of scaffolding structures are essential to ensure their stability and safety.
4. **Concrete Pouring:** Pouring concrete at height poses risks due to the weight and fluidity of the material. If not properly contained, spills or leaks can occur, potentially damaging adjacent properties or causing slip hazards for pedestrians.
5. **Window or façade Installation:** Installing windows or façade elements such as glass panels, supporting framework, aluminium panels, dry or wet cladding stone slabs etc. in high-rise buildings involves handling these materials at height. Mishandling or dropping these panels can result in significant property damage or injury to pedestrians below.
6. **Welding and Cutting:** Welding and cutting activities conducted at height can generate sparks and hot debris, posing fire hazards to adjacent properties and pedestrians. Proper fire safety measures, such as fire-resistant barriers and fire extinguishers, should be in place to mitigate these risks.
7. **Overhead Work:** Activities such as drilling, hammering, or equipment installation conducted overhead can dislodge objects or debris, potentially falling onto adjacent properties or pedestrians below.
8. **Crane Operations:** Crane operations are crucial in high-rise construction for lifting heavy materials and equipment. However, improper crane operation or maintenance can lead to accidents such as crane collapse or loads swinging out of control, posing risks to nearby properties and pedestrians.

To mitigate these hazards, construction companies must adhere to strict safety protocols, provide adequate training to workers, implement safety barriers and netting systems, regularly inspect equipment and structures, and coordinate with local authorities to ensure the safety of adjacent properties and pedestrians during construction activities.

## Chapter 2:

# Hazards at working at height during High Rise Construction

Working at height during high-rise construction presents numerous hazards that can endanger workers, adjacent properties, and pedestrians. Here are some of the key hazards:

1. **Falls:** Falls from height are one of the most significant hazards in construction. Workers can fall from scaffolding, platforms, ladders, or openings in the building structure. Proper fall protection measures such as guardrails, safety nets, and personal fall arrest systems (PFAS) must be in place.
2. **Collapse of Structures:** During construction, the structural integrity of the building may not yet be fully established. A collapse or partial collapse of the structure can endanger adjacent properties, causing significant damage and potential injuries to occupants or pedestrians nearby. Scaffolding, formwork, or other temporary structures used for working at height can collapse if not properly erected or maintained. This can result in workers falling and being struck by falling objects. Scaffolding used for accessing heights can collapse due to improper assembly, overloading, or environmental factors. If scaffolding collapses, it can damage nearby buildings or obstruct pedestrian pathways, posing safety risks.
3. **Falling Objects:** Tools, equipment, materials, and debris can be dropped or dislodged from height, posing a risk to workers below as well as to adjacent properties, vehicles and pedestrians. Tools should be tethered, and debris netting or toe boards should be installed to prevent objects from falling. This is the focus of the current report. Such accidents have prompted the petitioners to approach the High Court and secure an order to form this committee to look into the measures that can be recommended to relevant authorities to minimize such accidents in future.
4. **Unsafe Access and Egress:** Workers may face hazards while accessing or exiting elevated work areas, such as using unstable ladders, climbing unprotected edges, or navigating through congested areas. Safe access routes and properly secured ladders or stairways are essential.
5. **Weather Conditions:** Wind or rain can create slippery surfaces and unstable working conditions at height. Extreme weather can also increase the risk of falling objects or scaffold collapse.
6. **Electrical Hazards:** Working near power lines or using electrical equipment at height poses the risk of electrocution if proper precautions are not taken. Workers should be trained in electrical safety and use insulated tools when necessary.
7. **Confined Spaces:** Working in confined spaces at height, such as elevator shafts or mechanical rooms, presents additional risks due to limited access and ventilation. Proper training and safety procedures are essential when working in confined spaces.
8. **Rescue and Emergency Response:** In the event of a fall or other emergency at height, prompt rescue and medical assistance are critical. Adequate rescue plans and trained personnel should be in place to respond to emergencies quickly and effectively.

9. **Fatigue and Human Error:** Working at height can be physically demanding and mentally taxing. Fatigue and human error increase the risk of accidents, especially when performing repetitive tasks or working long hours.
10. **Cranes and other Equipment Failure:** Cranes are commonly used in high-rise construction to lift heavy materials and equipment. Accidents involving cranes, such as collapse or malfunction, can cause extensive damage to adjacent properties and pose a threat to pedestrian safety. Malfunction or misuse of equipment such as cranes, hoists, or aerial lifts can lead to accidents at height. Regular inspections, maintenance, and operator training are essential to prevent equipment-related hazards.
11. **Construction Noise and Vibration:** High-rise construction often involves noisy activities such as drilling, hammering, and heavy machinery operation. Excessive noise and vibration can cause structural damage to adjacent buildings and disrupt the peace of surrounding neighbourhoods.
12. **Dust and Air Pollution:** Construction activities generate dust and airborne pollutants, which can settle on adjacent properties, affecting air quality and potentially causing damage to structures and vegetation.
13. **Traffic Disruption:** High-rise construction sites often require road closures, detours, or restricted pedestrian access. Traffic congestion and disruptions to pedestrian movement can inconvenience nearby residents and businesses, affecting their daily routines and economic activities.
14. **Exclusion Zones:** To ensure safety, construction sites may need to establish exclusion zones around the perimeter, limiting access for pedestrians and vehicles. This can disrupt normal pedestrian flow and access to nearby properties, impacting businesses and residents.

To mitigate these hazards and potential damage to adjacent properties and pedestrian movement, construction companies must implement strict safety measures, adhere to regulatory requirements, provide adequate signage and barriers, conduct regular inspections of equipment and structures, and communicate effectively with stakeholders, including neighbouring property owners and local authorities. Additionally, proactive planning and risk assessment can help identify potential hazards and minimize their impact on surrounding areas during high-rise construction projects.

The next chapters in this report aim at recommending appropriate measures to be adopted by the construction agencies under the regulations to be formed by the authorities. The report is restricted to the recommendations that cover the Falling Objects, Crane Operations, Crane Accidents and Exclusion Zones. Other hazards which are mentioned in this section are to be addressed by the Safety Officer as his routine responsibility. It should be noted that adequate guidelines for the safety of workers covering other hazards mentioned above are already present in various notifications published by relevant authorities, some of which were also studied by the present committee during the compilation of this report and are mentioned in the list of literature attached in the annexure.

## Chapter 3:

# Recommendation to appoint a Safety Officer

## PREAMBLE

### Why is a Safety Officer needed?

Having a licensed safety officer on a construction site is necessary for several reasons:

1. **Compliance with Regulations:** Construction sites are subject to numerous regulations and safety standards set forth by local, state, and federal governments. A licensed safety officer ensures that the site is compliant with these regulations, reducing the risk of fines and legal penalties.
2. **Risk Management:** Construction sites pose numerous hazards, including falls, electrical hazards, hazardous materials, and machinery accidents. A safety officer identifies these risks and implements measures to mitigate them, reducing the likelihood of accidents and injuries.
3. **Worker Safety:** The primary responsibility of a safety officer is to ensure the safety and well-being of workers on the construction site. He conducts safety training, enforces safety protocols, and performs regular inspections to identify and address potential hazards.
4. **Prevention of Accidents:** Accidents on construction sites can result in injuries, fatalities, property damage, and project delays. By proactively identifying and addressing safety hazards, a licensed safety officer helps prevent accidents from occurring in the first place.
5. **Enhanced Productivity:** A safe working environment is essential for productivity on a construction site. When workers feel safe and confident in their surroundings, they can focus on their tasks without worrying about potential hazards or accidents.
6. **Liability Reduction:** Employing a licensed safety officer demonstrates a commitment to safety, which can help reduce liability in the event of an accident or injury. It shows that the employer has taken reasonable steps to ensure a safe work environment.
7. **Emergency Preparedness:** Safety officers are trained to respond to emergencies such as fires, chemical spills, or medical emergencies. Their presence ensures that appropriate emergency procedures are in place and that workers know what to do in case of an emergency.

Overall, having a licensed safety officer on a construction site is essential for ensuring compliance with regulations, managing risks, protecting worker safety, preventing accidents, enhancing productivity, reducing liability, and being prepared for emergencies.

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*The following recommendation is based on THE BUILDING AND OTHER CONSTRUCTION WORKERS' (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996*

Specifically, CHAPTER VII SAFETY AND HEALTH MEASURES under Sr No. – 38 mentions about “Safety Committee and Safety Officers” state as under

(1) In every establishment wherein five hundred or more building workers are ordinarily employed, the employer shall constitute a Safety Committee consisting of such number of representatives of the employer and the building workers as may be prescribed by the State Government: Provided that the number of persons representing the workers, shall, in no case, be less than the persons representing the employer.

(2) In every establishment referred to in sub-section (1), the employer shall also appoint a safety officer who shall possess such qualifications and perform such duties as may be prescribed.

**Reference to BOCW act 1996 - CHAPTER VII SAFETY AND HEALTH MEASURES – Point 38 - Safety Committee and Safety Officers:**

Planning, Approving & Contracting Government Authorities of building and other construction project must add an additional condition for appointment of Qualified safety officers and supervisors/supporting staff by client/contractor and to Ensure the following safety precautions are effectively implemented at site and strictly monitored on daily basis to avoid any accident/Incident may happened during construction.

(a) A person shall not be eligible for appointment as a safety officer unless he/ she:

- (i) possesses a recognized degree in any branch of engineering or technology and had a practical experience of working in a building or other construction work in supervisory capacity for a period of not less than 2 years or possesses a recognized diploma in any branch of engineering or technology and has had practical experience of building or other construction work in supervisory capacity for a period of not less than 5 years;
- (ii) possesses a degree or diploma in industrial safety with at least one paper in construction safety (as elective) and recognized by the State Government in this behalf; and
- (b) has adequate knowledge of the language spoken by majority of building workers from the construction site in which he is to be appointed. Notwithstanding the provisions contained in clause (a) any person who.
  - (i) possesses a recognized degree or diploma in engineering or technology and has had experience of not less than 5 years in the department of State Government which deals with the administration of the Factories Act, 1948 and or Dock Workers (Safety, Health and Welfare Act, 1986 and or Building or Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.
  - (ii) possesses a recognized degree or diploma in engineering or technology and has had experience of not less than 5 years training education constancy or research in the field of accident prevention in industry or in any part or in any institution or in any establishment dealing with building or other construction work shall also be eligible for appointment as a safety officer;

Provided that, in case of person who has been working as safety officer in industry or port or in any institution or in any establishment dealing with building or other construction work for a period of- not less than 3 years on the date of commencement of these rules, the Chief Inspector may, subject to such conditions that he may specify, relax all or any of the above said qualification.

**Condition of service. –**

(a) Where the number of safety officers appointed exceeds one, one of them shall be designated as Chief safety Officer and shall have the status higher than the others. The Chief Safety Officer shall be in overall charge of the safety functions as envisaged in sub- clause (IV) and also other safety Officers working under his control.

(b) The Chief Safety Officer or Safety Officer, where only one safety officer is appointed shall be given the status of chief executive and he shall work directly under the control of his Chief Executive. All other safety Officers shall be given an appropriate status to enable them to dispatch their functions effectively.

(c) The scale of pay and allowances to be granted to the safety officers including the Chief Safety Officers and the other conditions of their service shall be the same as those of the officers of corresponding status of the establishment in which they are employed.

**Duties of Safety Officer. -** (a) The duties of a Safety Officer shall be to advise and assist the employer in the fulfillment of his obligations, statutory or otherwise concerning prevention of personal injuries and maintaining a

safe working environment. These duties shall include the following, namely. -

- (i) to advise the building workers in planning and organizing measures necessary for effective control of personal injuries;
- (ii) to advise on safety aspects in a building or other construction work and to carry out detailed safety studies of selected activities;
- (iii) to check and evaluate the effectiveness of action taken or proposed to be taken to prevent personal injuries;
- (iv) to advise purchasing and ensuring high quality of personal protective equipment conforming to national standards;
- (v) to carry out safety inspections of building or other construction work in order to observe the physical conditions of work and the work practices and procedures followed by building workers and to render advice on measures to be adopted for removing unsafe physical conditions and preventing unsafe actions by building workers;
- (vi) to investigate all fatal and selected accidents.
- (vii) to investigate the case of occupational diseases contacted and reportable dangerous occurrences.
- (viii) to advise on the maintenance of such records as are necessary to accidents, dangerous occurrences and occupational diseases;
- (ix) to promote the working of safety committees and to act as an advisor to such committees. to organize any association with concerned departments, comparing, completions, contests and other activities which will develop and maintain the interest of building workers and establishments and maintain safe conditions of work and procedures.
- (x) to design and conduct either independently or in collaboration with other agencies suitable training and educational programs for prevention of accidents to building workers.
- (xi) to frame safe rules and safe working practices in consultation with senior officials of the establishment.
- (xii) supervise and guide safety precautions to be taken in building and other construction work of the establishment.

**Facilities to be provided to safety officer.** - The employer shall provide each safety officer with such facilities, equipment and information that are necessary to enable him to discharge his duties effectively.

**Prohibition of performance of other duties.** - No safety officer shall be required or permitted to do any work which is unconnected to, inconsistent with or detrimental to the performance of the duties prescribed in this Schedule.

**Exemptions.** - Chief Inspector may in writing exempt any employer or other group or employers from any or all provisions to these rules subject to compliance with such alternative arrangements as may be approved by him.

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## RECOMMENDATIONS

1. The Committee recommends that a special professional license be introduced in the MCGM's Building Proposal Department for qualifying Licensed Safety Officer for every building project in the City.
2. Licensed Safety Officer (LSO) shall be appointed at every site and he shall be full time available at the site until crane is decommissioned and dismantled..
3. The said safety officer shall have Diploma or Degree in Civil, Mechanical, Electrical or Industrial Engineering with specialization in Safety. The specialization in Safety shall be minimum

Diploma from CLI/RLI/State Technical Board, if such specialization facility is not available in his parent college/institute from where he obtained his Diploma or Degree.

4. He should be conversant with all requirements of IS codes, development regulation & best international practice in safety of cranes.
5. In particular, LSO should be also acquainted with the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER): These regulations specify responsibilities for the safe lifting and operation of equipment, including tower cranes. It covers thorough examinations, maintenance, and operator competence.
6. LSO shall be conversant with Construction (Design and Management) Regulations 2015 (CDM Regulations): These regulations apply to construction projects and emphasize the importance of planning and managing the health and safety risks associated with tower crane operations.
7. The Local body – in this case the Municipal Corporation of Greater Mumbai, Building Proposals Department – shall issue license to Licensed safety officer (LSO).
8. The license issuing authority – i.e. MCGM Building Proposals Department – should demand periodic reports of safety related measures and violations if any, mishaps, accidents and the actions taken by the LSO to address these events as per the regulations mentioned above in accordance with the recommendations of BOCW every six months during the construction period of every project on record of the Building Proposals Department. Periodic reports to also include internal audits data, Non compliances raised with corrective/preventive actions taken, record of incidences and near misses, if any.
8. LSO will be responsible for training the workforce periodically or when a new process or equipment is introduced to the construction site, enforce safety protocols, and perform regular sessions with the workers to apprise them to identify and address potential hazards.
9. It shall be the responsibility of the LSO to diligently undertake all periodical safety checks specified by the IOD conditions, Crane and other equipment manufacturers, conduct audit of the qualifications of the operating and other assisting personnel periodically, daily safety related supervision etc., and write relevant reports as required at the specified intervals as per the safety manual.
10. Safety Officer shall be responsible to report each and every actual incident that involves failure of machinery – specifically cranes and its components, consequent damage to life and

property, injuries and the immediate reactive measures that he had taken himself or directed to be taken by the relevant personnel on site.

11. It will be necessary for the LSO to report near miss events as well, and narrate the possible consequences if that incidence had actually happened.
12. It will be LSO's responsibility to ensure that all the mitigating measures as well as the arrangements to immediately react to all possible failures described in the Chapter 2 and Chapter 3 that can happen on the site are maintained in ready and standby mode so that the response to the ensuing situation is quickest and the most appropriate.
13. All High Rise buildings (120 mts and above) shall have full time Safety team under Project Manager to conduct day to day safety awareness program and implementation of safety induction and to ensure all the activities carried out at site, specifically all equipments and crane operations are done under the strict supervision of the Safety team. The team shall comprise of LSO, Assistant Safety Officer and two safety technical staff.

# Chapter 4:

## Recommendations for Crane Operations

### PREAMBLE

#### Possible Incidences Involving Cranes

1. **Tower Crane Collapse:** Tower crane can collapse either due to its design deficiency, overloading or eccentric loading, sudden braking during heavy winds.
2. **Fall of Material:** Selection of wrong lifting tool for material, damaged wire rope or Sling or Belt or Chains or synthetic web sling or D-shackle or combination of any of these being damaged, overloading, wrong rigging practice are some of the reasons of accidental falling off of the material during crane operations.
3. **Failure of Ropes:** Wrong handling of the controls, deformation due to wrong revving, improper maintenance, damage to the rope by contact with sharp edges of building or of the materials being lifted can cause failure of ropes, and consequent accidental fall of materials at unpredictable locations.
4. **Failure of Limit Switches:** Limit Switches can fail if the maintenance is improper or if they are open to atmosphere.
5. **Improper Signaling:** Incompetent, unqualified or inexperienced signalman, miscommunication between the crane operator and the signalman or defective wireless device not transmitting the communication properly are the most hazardous reasons for accidents on sites.
6. **Break failure-** Improper or lack of maintenance can cause break failure that may lead to free fall or collapse of the load to the ground.
7. **Entanglement of tower crane:** Anti-Collision Device (ACD) bypassing, incompetency of the operator or failure of the signalman to communicate with the operator for any reason such as non-working of walkie-talkie, language incompatibility, misunderstanding the signals etc. are some of the reasons when the tower crane can get entangled with other crane or other objects.
8. **Incompetent Operator:** An unqualified, inexperienced and overconfident crane operator can cause serious accidents with the crane. Lack of knowledge of a newly employed crane or equipment or its operational controls can be dangerous. Fatigue due to overwork or physical condition of the operator is another factor to be considered while employing the operator on each occasion.

9. **High speed of Wind:** High wind speeds occurring during the operations, specially gusts of shorter periods, is a natural phenomenon. The crane operator should be conscious of the constantly varying wind speed and direction and maneuver the crane by applying necessary corrections to his operations.
  
10. **Fire in the Cabin:** A short circuit or undesired activities such as smoking or lighting incense stick in the cabin can cause incidents of fire in his operating cabin where the operator may panic and is helpless to mitigate the fire being all alone at a height can result in losing his control over the operations and serious damage can take place at the ground level.

**PREVENTIVE MEASURES TO BE INSISTED ON ISSUING PERMISSION TO USE CRANES ON CONSTRUCTION SITES.**

1. The lifting area must be barricaded with caution tape.
  
2. Ensure that the loading area is in level and is firm, non-yielding. Similarly, the stacking area and the location of lowering the material shall be firm and non-yielding.
  
3. The employer shall ensure at a construction site of a building or other construction work that no person is employed to drive or operate a lifting appliance, whether driven by mechanical power or otherwise or to give signals to drive or operator of such lifting appliance or to work as a operator of a rigger or derricks unless he—
  - (i) is above eighteen years of age;
  - (ii) is sufficiently competent and reliable; (See qualifications of personnel in DETAILS OF SAFETY OFFICER CRANE OPERATORS AND SIGNAL MEN mentioned in the RECOMMENDATIONS)
  - (iii) possesses the knowledge of the inherent risks involved in the operation of lifting appliances; and
  - (iv) is medically examined periodically as specified in Schedule VII annexed to these rules.
  
4. There should be no bypassing of the operational protocol or instrument control processes.
  
5. Crane operators must be operationally competent, qualified and physically fit. A regular medical checkup is recommended for a crane operator in view of the necessity of him to be left alone in stressful conditions in a remote spot for long periods. (See Chapter 7 for minimum qualifications for a Crane Operator)
  
6. Operator shall not indulge in playing with electrical controls and wiring of the system inside the cabin so as to cause short circuits. Any change in the instrument reading which he feels is unduly beyond the normal ranges, shall be brought to the notice of the crane mechanic and the anomaly shall be corrected before resuming the operations.

7. Crane operator shall not light matches, smoke in the cabin or burn incense sticks, candles etc. that may result in fire in the cabin.
8. Fire Alarm system in the operator's cabin should be always functional.
9. Crane operator shall immediately bring to the notice of the crane mechanic, any damage to the walls, windows, roof or floor of the cabin so that the cabin can be repaired and made weatherproof to prevent discomfort to the crane operator and damage to the equipment controls, electronic/electric equipment and instruments inside the cabin.
10. Signalmen must be competent and qualified as per recommendations in Chapter 7.
11. The communication equipment such as walkie-talkie sets shall be tested every day for their working, noise, disturbance, volume, and frequency compatibility with other instruments in the group before using them in operation. If the communication sets produce any disturbance in the transmission of sound, the crane operations shall be immediately stopped until the walkie-talkie system is restored to the full satisfaction of the LSO.
12. The maintenance of the crane and its components and allied accessories not in currently used, shall be regularly inspected and maintained as per the manufacturer's recommendations. A logbook recording the regularity of the inspection and maintenance activities must be maintained and available on the site for the scrutiny of visiting representatives of authorities at all the times.
13. All sensitive electronic and electric equipment and its controls shall be properly covered and insulated from atmospheric elements.
14. The crane and other equipment shall not be handled by unauthorized personnel. The person in charge, licensed to operate the crane shall handle the equipment exactly in accordance with the operating instructions.
15. The ropes shall be inspected daily for any damage due to sharp edges of the lifted material. All sharp-edged materials shall be lifted only after inserting sufficient cushioning material between the sharp edges and the ropes at the points of contact without fail. Role of the groundmen including the signalmen is most important in this precautionary activity.
16. Design of the foundation of the crane, collar beams, tie beams at various levels etc. shall be checked and vetted by the structural engineer on record for the same project with his certificate of safety and stability for the stated elements on the basis of the reaction forces provided by the manufacturer. The liability of the structural engineer is limited to the extent that the calculations are appropriate on the basis of the data provided to him by the crane manufacturer.

17. An Automatic Safe Load Indicator (ASLI) system must be a part of the crane assembly. Such a system shall be properly monitored and calibrated periodically by an authorized agency. The crane operator shall not lift a load if a warning is received from such Automatic Safe Load Indicator (ASLI) System.
18. A Licensed Safety Officer shall be always vigilant to notice any such alarms from the system and immediately prevent lifting of loads beyond limits.
19. During heavy wind, crane should be in free motion and free of breaks so that the crane boom stays aligned to the direction of wind. The hook shall be withdrawn to its highest possible position without allowing it to sway. There should be no weight attached to the hook in the break-free motion condition.
20. LSO shall update himself and the crane operator about the weather forecast for the day received from authentic sources every day when beginning the shift.
21. Proper lifting tools as recommended by the manufacturer to be used for respective material to be lifted.
22. Timely inspection of all Lifting tools and testing of the tools at the specified intervals is necessary. Damaged lifting tools should not be stored on the site.
23. Qualified/Certified rigger should be deputed and proper rigging SOP followed/adopted.
24. While lifting any material, the operator shall ensure that the likely sway of the material due to the motion of the crane and the wind is sufficiently away from any man, material stacks, structure or buildings. Any type of collision shall be completely avoided during operations of the crane.
25. Brakes of the cranes for all its movement operations shall be thoroughly checked prior to beginning the operations of a shift without any weight attached to the hook. Oil changes, Greasing and other maintenance shall be periodically undertaken as per manufacturer's recommendations and a log shall be kept for the scrutiny of the LSO.
26. ACD (Anti-Collision Device) bypassing key shall be removed from the operator's cabin and kept with relevant authority on the construction site. ACD shall be always in the "on" position during the crane operations.
27. LSO to submit monthly report on crane operation about adherence to IS Codes and guidelines mentioned in manufacturer's manuals.
28. Every crane that is installed on the site must have the following inbuilt safety features.

- b. **Hoist Limit Switch** – allows stopping the hoisting movement when the hook block approaches the trolley. It also forbids the winding of the rope on the hoist drum in reverse direction during lowering of the weight.
- c. **Trolley Limit Switch** – Stops Trolley movement when it approaches the jib foot or nose ends.
- d. **Moment Cutout** – The cranes are designed for constant maximum load moment. Under no circumstances the crane should exceed the design load moment. This cutout stops hoisting whenever hoisting is attempted to lift heavier than rated loads. This is more applicable to travelling type of cranes.
- e. **Maximum Safe Working Load Cutout** – The crane operation must be stopped, whenever overloading occurs, beyond permissible limits. Many manufacturers provide electronic Load Moment Indicators integrated with overload protection and features which allow the crane to revert to safe conditions like lowering of the load or inward movement of the trolley. While some provide mechanical deforming rings with electrical limit switches. In both cases the device has to be initially calibrated and later after recommended periodic intervals.
- f. **Anti rope fall out device** -This is a mechanical device mounted on the hook block to prevent the hoist rope falling out whenever the same is completely lowered and resting on the ground.
- g. **High Wind Speed Protection** -This is an electromechanical protection mounted on top of a tower crane. Usually, the maximum permissible wind speed for safe operation of a tower crane is 25 kms. per hour. This device comprises of a small wind turbine. The number of rotations generates an electrical signal which calibrated to the wind speed. As soon the wind speed exceeds the permissible limit, it stops the crane's operations.
- h. **Dead Men Censor** – Censor provided in crane joystick to detect the process of holding the joystick.
- i. **Anticollision Device** – Device avoids the collision of two or more adjacent cranes.

Any crane not having any of the above automated control systems shall not be installed on the site. All the controls shall be in excellent condition while the crane is in use on the site. Regular inspection and maintenance log shall be kept on the site for the scrutiny of the relevant authorities at all the times during the crane implementation period.

# Chapter 5:

## Recommendations for Façade and Other Installations at height

### PREAMBLE

#### Hazards due to construction activities on the building perimeter

While crane operations have been described and possible hazards and corresponding mitigation measures enumerated in the previous chapter, the activities that go on for the completion of the façade of the building that may not involve use of crane after the material is deposited on a particular floor, also become hazardous if not conducted in a safe manner. This chapter identifies such dangers and recommends a set of guidelines to be followed.

#### Safe Work Procedures

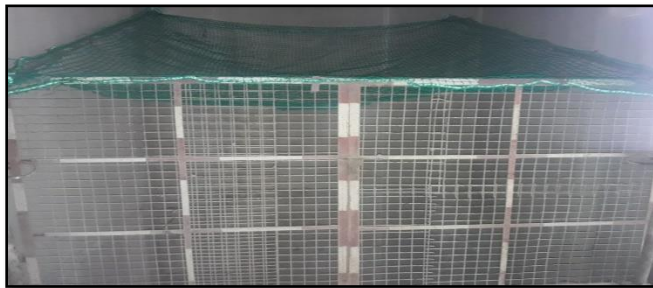
1. If Cladding or other permanent facade is installed over the external RCC walls, there should be a redundancy of at least 30% in terms of the number of fixtures of the same capacity as that of the number of fixtures required for sustaining the design reactions without a safety margin.
2. Appropriate measures shall be taken to ensure prolonged life of the fixtures – at least equal to the design life of the building itself – by way of choosing the right materials that will be anti-corrosive or protected with appropriate anti-corrosion coating.
3. Open decks and balconies shall have vertical mullions and glass (or parapets of other material) up to a minimum of 1.8 m to avoid falling objects. The parapet or the glass railing shall be designed to resist the horizontal live load as per IS 875 Part 2 combined with wind pressure as per IS 875 Part 3 or as provided by Wind Tunnel Test Agency if carried out whichever of the two is more.
4. The refuge areas which are open to sky, projecting outside the building line should have protective roof. This will protect the people assembled on the refuge area from falling debris in case of calamitic incidences such as fire.
5. Urban Local Body, MCGM in this case, should insist on a periodic inspection of the permanent cladding and façade system by a competent structural auditor. Such inspections shall be at intervals of five years commencing from the date of the completion of the building. Certification from a licensed structural auditor shall be mandatory after such inspections.

6. Outdoor AHU units, antennas and any other fixtures on the façade, parapets, balconies and terraces, shall be designed in accordance with the provisions for Non-Structural Elements as given in IS 16700 - Criteria for Structural Safety of Tall Concrete Buildings. These provisions (for Non-Structural Elements) shall be equally applicable to the nonstructural elements in other types of buildings also, such as steel buildings, composite buildings, precast buildings etc. A certificate from the Licensed Structural Engineer on Record shall be submitted at intervals of every five years to confirm the adherence of this condition. The structural engineer shall issue such a certificate for NSE stability and safety which is limited to the day of his inspection. In case any violation is conducted prior or after the day of the inspection leading to any mishap, the structural engineer issuing the certificate shall not be held responsible. For preventing any violation of this condition, the office bearers of the Housing Society or the Association shall be made responsible.
7. Typically, in High Rise Building constructions sequencing of work starts from RCC, masonry work, finishing work, etc. The safety net shall be installed at a level not lower than three floors below every level on which the work is in progress. Such a safety net shall be a minimum of 3 m in width all around the perimeter of the building.
8. However, a permanent safety net / fall protection net must be provided until completion of the project at lowest floor level of the building ensuring smooth movement of any emergency vehicles. Such a safety net shall be a minimum of six meters in width with framing, all round the perimeter of the building. The supports of the safety net shall be anchored to the parent structure.

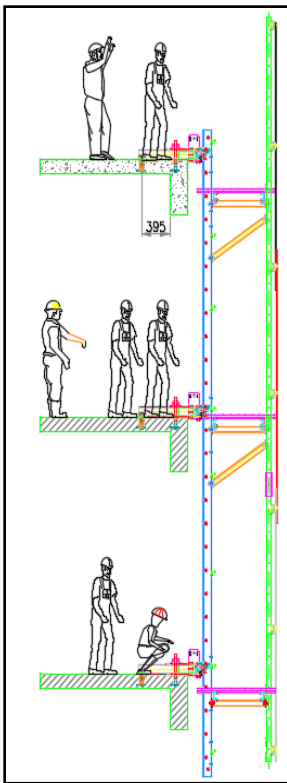




14. The safety platform shall have a railing at least 1.2 m high on its external edge as well as at inner edge at the locations of cutouts, staircase mid landings on the face of the building or shafts on the perimeter of the building.
15. Such a safety climbing platform shall be minimum 1.2 meters in width and 3 meters high enclosure, or more if it is intended to be used for any other construction activity, all round the perimeter of the building. The supports of the safety platform shall be anchored to the parent structure. The supporting and framing members of the safety platform and the anchors shall be designed and detailed either by the Structural Engineer on Record of he shall approve and vet the calculations and drawings prepared by a competent structural engineer appointed separately by the developer/owner/contractor responsible for the construction. Such calculations and drawings shall be submitted as a part of monthly reporting by LSO with regards to erecting the platform, or when it is shifted to a higher level to fulfil the condition of maximum separation of the safety platform and the level on which the work is in progress as 11 above.
16. Safety Gates/ guards for all the openings including Lift Shafts & staircase well shall be installed for avoiding any accidental human fall.



17. Safety Screens must be installed on the level on which the work is in progress. Such safety Screen system shall climb up as the construction progresses from one floor to the upper.



*Safety Screens around the floor on which work is in progress*

18. All cutouts in the floors shall be protected with Edge Protection with MS Safety Railing.



19. Safety Belts of all the workers shall be regularly tested. Workers shall be repeatedly reminded about use of safety belts and helmets while on the site. Demonstration and training shall be periodically conducted in this regard.



*Checking the safety belts*

# Chapter 6:

## Recommendations for Safeguarding Adjacent Areas

### PREAMBLE

Safeguarding adjacent areas surrounding a high-rise building construction site is essential to ensure the safety of nearby properties, pedestrians, and the surrounding environment. Here are some recommendations to consider:

### MEASURES TO SAFEGUARD ADJACENT AREAS

#### 1. Site Perimeter Security:

- Erect sturdy fencing or hoarding around the construction site perimeter to prevent unauthorized access.
- Install warning signs indicating construction hazards and restricted access zones.
- Implement surveillance cameras to monitor the perimeter for unauthorized entry and potential security threats.

#### 2. Traffic and Pedestrian Management:

- Develop a traffic management plan to minimize disruptions to vehicular and pedestrian traffic.
- Provide clear signage indicating alternative routes and pedestrian pathways.
- Coordinate with local authorities to implement temporary traffic control measures, such as road closures and detours, as needed.
- Assign trained personnel to manage traffic flow and ensure the safety of pedestrians near the construction site.

#### 3. Debris Containment and Dust Control:

- Use debris netting or scaffolding enclosures to contain construction debris and prevent it from spreading or falling onto adjacent areas.
- Implement dust control measures, such as watering down dusty areas and using dust suppression technologies, to minimize airborne dust pollution.
- Conduct regular street sweeping and cleaning to mitigate the accumulation of debris and formation of slippery surface on nearby roads and sidewalks.

#### 4. Protection from Falling Objects

- Use safety nets at various levels, preferably not more than 2 floors below where the construction activities are going on.
- Use perimeter protection screens at levels where construction activities are in progress.
- Areas on ground outside the construction plot shall be protected by using firm and well-designed temporary shed like structure (Refer Annexure 5) to arrest fall of any object on the road or on adjacent properties over which the crane boom is likely to hover and pass during its operation.

**5. Noise and Vibration Mitigation:**

- Implement noise barriers or soundproofing measures to minimize the impact of construction noise on adjacent properties.
- Schedule noisy construction activities during off-peak hours to reduce disturbance to nearby residents and businesses.
- Monitor vibration levels and implement mitigation measures, such as installing vibration dampening devices, to prevent structural damage to adjacent buildings.

**6. Structural Protection:**

- Conduct structural surveys of adjacent buildings before construction begins to identify vulnerable areas and assess the risk of damage.
- Install protective measures, such as vibration isolators or temporary bracing, to safeguard adjacent structures from construction-related vibrations and impacts.
- Implement regular monitoring of adjacent buildings during construction to detect any signs of structural damage and take appropriate corrective actions.

**7. Emergency Preparedness and Response:**

- Develop an emergency response plan outlining procedures for addressing accidents, spills, fires, or other emergencies on the construction site.
- Conduct regular drills and training sessions to ensure that construction workers are prepared to respond effectively to emergencies.
- Coordinate with local emergency services to ensure prompt assistance in the event of an emergency.

**8. Community Engagement and Communication:**

- Establish open lines of communication with neighboring property owners, residents, and businesses to address concerns and provide updates on construction activities.
- Hold regular community meetings or information sessions to discuss project timelines, potential impacts, and mitigation measures.
- Respond promptly to complaints or feedback from the community and take proactive measures to address any issues raised.

By implementing these recommendations, construction companies can effectively safeguard adjacent areas surrounding a high-rise building construction site and minimize the potential impact on nearby properties, pedestrians, and the surrounding community.

## RECOMMENDATIONS

1. The committee is of the opinion that the boom of any tower crane should not project outside the plot under construction. Where the same is not possible, the crane should be programmed so that, jib/hook shall remain well within the plot under construction.
2. Irrespective of the compliance of point 1 above, a protective arcade shall be erected in the adjoining occupied plot or the part of the road over which the sweep of the crane boom overlaps. This arcade shall be designed structurally to withstand fall of a weight equal to the capacity of the crane from the highest point to which the crane hook is likely to be lifted with the material. *(See Annexure 5 for graphic explanation.)*

Such a protective arcade shall be designed by the structural engineer on record for the project or by a qualified structural engineer and vetted by the structural engineer on the record. The design and drawings of the same shall be submitted under the license number of the structural engineer on record to the BP before erecting the arcade.

No lifting operations shall be permitted unless the protective arcades in the parts of the road or in the adjoining property on all sides of the plot are erected as per the approved and submitted drawings and design calculations.

3. Safety net and safety platform shall be installed along the entire perimeter of the building at no lower than three floors below the level at which the work is in progress, so that accidental falling debris shall not cause any injury or damage. *(See Annexure 6 for graphic explanation.)*

Such a safety net and safety platform shall be designed by the structural engineer on record for the project or by a qualified structural engineer and vetted by the structural engineer on the record. The design and drawings of the same shall be submitted under the license number of the structural engineer on record to the BP before installing the safety net and safety platform.

No work at heights shall be permitted unless the safety net and the safety platform are erected on the entire perimeter of the building at the level specified above, as per the approved and submitted drawings and design calculations.

# Chapter 7:

## Building Plan Approval Conditions related to Operations involving Cranes in High-Rise Buildings

### PREAMBLE

Notwithstanding issuance of guidelines, it is imperative that the implementation of the same shall be committed by the concerned user of the cranes and similar equipment installed and used in the construction of the High-Rise Buildings (120 mts and above). This is also equally applicable to low rise buildings, but using lifting equipment such as cranes, winches, derricks etc. Many a times, regulations play an important part in ensuring adherence to the rules. Such enforcement by way of insisting on keeping records of inspection and maintenance, records of mishaps and the measures taken to either mitigate them or actions taken to address the implications of them if they really occur etc. is necessary. Hence, the Committee wishes to recommend to the Planning Authority that certain documents shall be submitted at the time of issuing approval & monthly as report by LSO during the execution of the project. The authorities will hold the LSO responsible for the safety of the workers, adjacent properties and public at large which is exposed to hazards ensuing due to activities at height during the construction of buildings using tall lifting equipment. The following are the Committee's recommendations for such a documentation.

### RECOMMENDATIONS

1. Planning Authority (mentioned hereinafter as PA) shall include an approval condition that the Project Proponent submits **full details of the cranes** to be installed at site for the construction of the building of any nature, if the project requires installation of cranes.
2. Before allowing any kind of installation of crane systems at the particular site, '**Fitness of Tower / Climbing Crane Certificate**' from its manufacturer if purchased or from the owner of the crane if hired by the Project Proponent shall be submitted. This will be applicable for new as well as old cranes before redeployment.

## **CERTIFICATE FROM THE MANUFACTURER OR THE OWNER OF THE CRANE**

PA shall seek a certificate from the manufacturer or the owner of the crane:

- a. that the crane has been installed in accordance with the erection manual,
  - b. that its foundation has been constructed as per the forces provided by him on the foundation,
  - c. that the design of collar beam and the ties at various levels is appropriate for the reactions provided by him,
  - d. that all the instruments and controls are operational and calibrated after installation of the lift to his satisfaction.
3. A similar certificate (as in 2 above) shall be issued by the LSO at the beginning of the operations of the crane directly after the erection of the crane is completed, and every time the crane height is increased once it is installed. Such certificates shall be submitted throughout the project period by the LSO. These certificates shall be submitted monthly.
  4. Safety net and safety platform shall be installed so that accidental falling debris shall not cause any injury or damage. *(See Chapter 5 and point Nos. 9 and 10 hereinbelow, for requirements of submission to PA in this regard.)*
  5. PA is advised by the committee to receive the **details of the cranes** as mentioned below.

### **DETAILS OF TOWER CRANE**

- Number of Cranes installed on the Project:  
*(Information for the following points shall be furnished for each crane)*
- Manufacturer:
- Model No:
- Date of Manufacturing:
- Owner of the Crane:
- Capacity of the Crane – a table showing the lifting capacity v/s distance at which the weight is lifted.
- Boom Length (when the boom is horizontal in case of luffing cranes)
- Maximum height without ties that the tower can stand with the full capacity operation
- Number of tie levels required for the full height of the building:
- Levels at which the ties will be installed:
- Forces imposed by the ties on the building under construction at each tie level in graphic format.

- Reactions of the crane during operation on its foundation.
  - Foundation details of the crane, including calculations for the fixing bolts and supporting geotechnical report and recommendations if any.
  - Diagram of the boom movement in plan, showing its travel with respect to the plot boundaries showing the adjacent properties, roads etc. *(In accordance with the guideline sketch shown in Annexure 5)*
  - Certification from the manufacturer that all automated safety control switches and devices are operational and calibrated.
  - Interim inspection certificate confirming the crane is fit for use.
6. PA is advised by the committee to receive the **details of the crane operators and the Safety Officer** as mentioned below.

#### **DETAILS OF SAFETY OFFICER CRANE OPERATORS AND SIGNAL MEN**

- **Safety Officer:**
  - Educational Qualifications (As per the qualifications mentioned in this section in the beginning),
  - Certification of training in Industrial Safety from the institutes mentioned above or equivalent,
  - Total Years of experience and its details as a safety manager/officer in appropriate field.
- **Crane Operator:**
  - Educational Qualifications Minimum (12<sup>th</sup> Standard Pass),
  - Certification of training as Crane Operator from an accredited institute,
  - Adequate experience and its details as a Crane Operator
- **Signal Men:**
  - Educational Qualifications (Minimum 7th Standard Pass),
  - Adequate experience as Signal Man
  - Should be able to speak at least one language which is understood by the crane operator.

7. PA is advised to direct the project site in charge / developer / contractor to generate the following **reports at specified periods** and make them available to the inspectors from PA at any time during the project period for scrutiny.

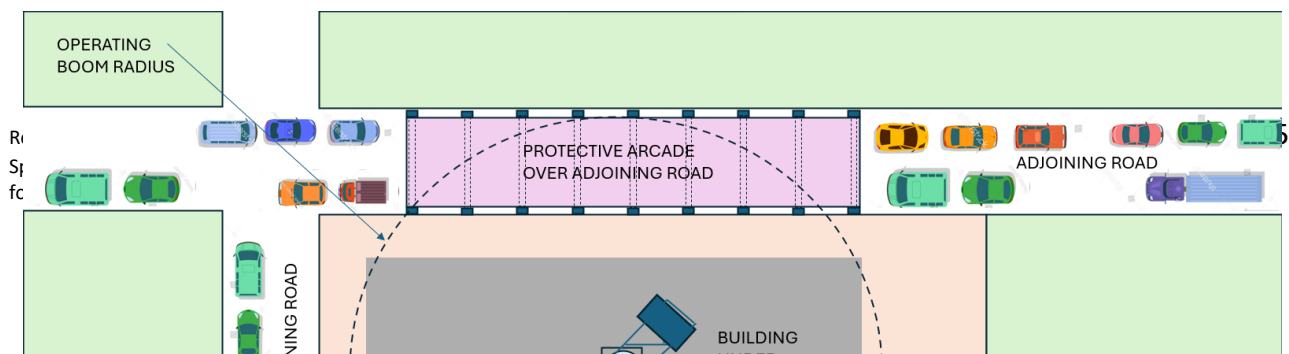
### REPORTS TO BE GENERATED PERIODICALLY

The following reports shall be generated at the specified intervals and kept at site for the scrutiny of the inspectors from the relevant authorities visiting the site throughout the period of construction.

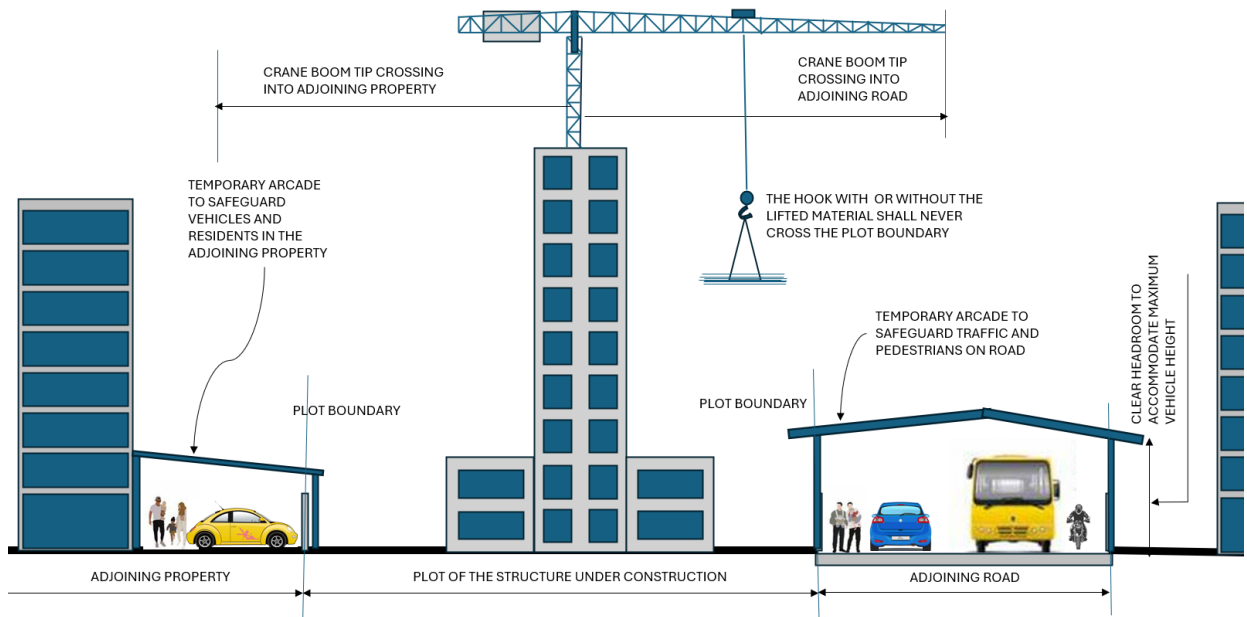
1. Daily Inspection Report
2. Inspection after every 250 hours of operation of tower crane
3. Inspection after every 500 hours of operation of tower crane
4. Inspection after every 1000 hours of operation of tower crane
5. Inspection after every 2000 hours of operation of tower crane

The standard checklists for all the above reports are given in Annexure – 5, Report Samples A to E.

8. As far as possible, the travel of the material lifting hook of the crane along the boom shall be restricted to the boundary of the plot under construction. Where the boom projects outside the plot, and if it is not feasible to keep the hook within the plot under reference due to operational reasons, adjoining properties and public roads should be protected from falling objects by erecting temporary structures. PA is advised to insist on submission of the arrangements in the areas under the sweep of the crane boom to safeguard against falling objects in the form of the **temporary protection of the adjoining properties and public roads** for the safety of the residents and pedestrians, also of the vehicles parked in the adjoining premises and on the roads with a well-designed temporary structure covering the affected premises and the exposed roads at the developer's/contractor's cost as per the graphic guidelines given in Fig.1. If demanded by the PA, the developer/contractor shall submit a drawing and the structural design calculations for such a protective arcade with certification from the structural engineer on record. (See Fig. 1 on the next page.)



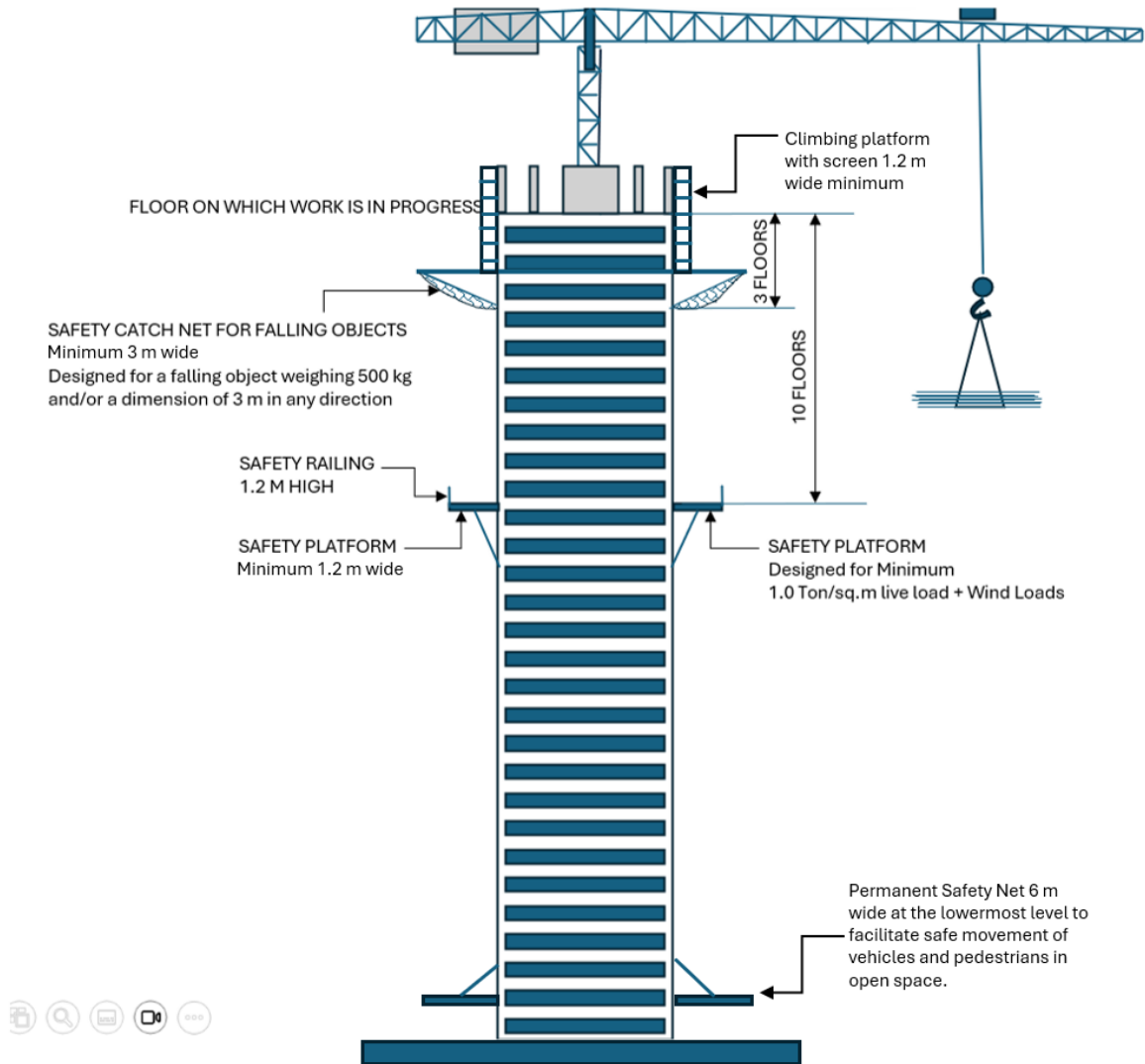
**PLAN SHOWING PROTECTIVE ARCADE IN CASE OF THE CRANE BOOM CROSSING PLOT BOUNDARY**



**SECTION SHOWING PROTECTIVE ARCADE IN CASE OF THE CRANE BOOM CROSSING PLOT BOUNDARY**

**Fig. 1**

9. PA is advised to insist on submissions of the arrangements to safeguard against falling objects in the form of the temporary protection of the adjoining properties and public roads for the safety of the residents and pedestrians, also of the vehicles parked in the adjoining premises and on the roads with a well-designed **safety net** attached to the building perimeter at the developer's/contractor's cost as per the graphic guidelines given in Fig.2. If demanded by the PA, the developer/contractor shall submit a drawing and the structural design calculations for such a protective net with certification from the structural engineer on record.



**Fig. 2**  
**Recommendation for Arresting Falling Objects – Graphic**

10. PA is advised to insist on submissions of the arrangements to safeguard against falling objects in the form of the temporary protection of the life and property in the plot under construction, adjoining properties and public roads for the safety of the residents and pedestrians, also of the vehicles parked in the adjoining premises and on the roads with a well-designed **safety platform** attached to the building perimeter at the developer's/contractor's cost as per the graphic guidelines given in Fig.2, If demanded by the PA, the developer/contractor shall submit a drawing and the structural design calculations for such a protective platform with certification from the structural engineer on record.
  
11. The committee strongly recommends that Urban Development Department, Government of Maharashtra, issue suitable directions / notification thereby empowering the PA to enforce the proposals given in 8, 9 and 10 above.

# **Annexure 1**

## **Order of the Bombay High Court**

The following pages shows the reproduction of the Bombay High Court Order against Writ Petition (L) No. 5627 of 2023 with Lokhandwala Residency Towers Co-op. Housing Society Ltd. as Petitioners Versus The Municipal Corporation of Greater Mumbai and others as Respondents, dated 09 March 2023

**IN THE HIGH COURT OF JUDICATURE AT BOMBAY  
ORDINARY ORIGINAL CIVIL JURISDICTION**

**WRIT PETITION (L) NO. 5627 OF 2023**

Lokhandwala Residency Towers Cooperative ... Petitioner  
Housing Society Ltd.

*Versus*

The Municipal Corporation of Greater ... Respondents  
Mumbai & Anr.

Mr. Prateek Seksaria, Senior Advocate, Mr. Prathamesh Kamath, Mr. Naku! Jain, Mr. Yash Chheda, Mr. Rohit Agarwal, Mr. Mridul Sharma, Ms. Poonam Shrivastav, Mr. Atul Umekar, Ms. Saakshi Saboo i/b. M.S. Legal (Advocates & Solicitors (UK)) for the petitioner.

Mr. Narendra V. Walalwalkar, Senior Advocate a/w. Ms. Vandana Mahadik for respondent no. 1.

Mr. Pramod Bhosale, SEPB (U/S) Ward present.

Mr. Zal Andhyarujina, Senior Counsel, Mr. Karan Bhide, Mr. Dhawal Mehta, Ms. Tanvi Shah i/b. Wadia Ghandy & Co. for respondent no. 2.

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CORAM: G. S. KULKARNI  
& R.N. LADDHA, JJ.

DATED: 09 March, 2023

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P.C.

1. This petition under Article 226 of the Constitution of India brings to the fore seminal issues, in regard to the safety measures to be adopted in the construction of super high-rise buildings and more particularly of the nature they are coming up in the contemporary times.

2. The trigger to this petition is an unfortunate incident, which had taken place on 14 February, 2023, arising from the high-rise construction being

undertaken by respondent no. 2 in respect of its project "Four Seasons Private Residences Phase I and Phase II", situated at plot no. 1/136, Dr. E Moses Road, Near Jijamata Nagar, Worli, Mumbai – 400 018. The terrible incident was falling of a large cement block from the 52<sup>nd</sup> floor of the building which is under construction, which instantly killed two innocent persons, who were outside the premises of respondent no. 2.

3. The grievance of the petitioner is in regard to the suspended crane installed by respondent no. 2 on its project, the operation of which is according to the petitioner is likely to endanger human lives, in the event of any negligence and/or its inappropriate handling or any other cause which may arise therefrom. The petitioner contended that a lack of proper care, negligence/mishandling has caused the unfortunate incident on 14 February, 2023. The petitioner has placed on record wide concerns raised all over, on the happening of such incident. The concerns are in regard to fears and panic in those who are vulnerable, and the urgent need for a regime of safety to be brought about in such works.

4. The petitioner contends that in the past there were serious incidents, which were the subject matter of correspondence entered between the parties as also the police authorities, by drawing the Court's attention to the letters dated 8 August, 2020 and 10 August, 2023 respectively of the petitioners and the

responses thereto of respondent no. 2, on the concerns raised by the petitioner. Our attention is also drawn to respondent no. 2's letter dated 12 August, 2020, as addressed to the petitioner, which is quite relevant in the present context. Respondent no. 2 in such letter has stated that the activity of shifting glass panels from the stacking area had commenced and there was some routine activity in progress since September, 2019 and as per practice, the weather forecast was also examined. Respondent No.2 recorded that crane operation was halted, when there was a "red alert" issued by the MCGM on the weather conditions. The crane operator had also verified the wind pressure and it was found to be within limits at the relevant time. It was also stated that the operations and safety domain personnel were on duty during the course of incident which had taken place, namely, the facade construction manager, the crane operator, the signalman and the safety officers who were competent by qualification and reasonably experienced to perform their designated duties. Respondent no. 2 also commented on the risk analysis and the procedure of shifting every type of material by use of the crane. Accordingly, by such letter, respondent no. 2 placed on record that all precautions were being taken in undertaking construction of such nature. It however, appears that although such safety measures were informed to be taken in the course of execution of such works, nonetheless the unfortunate incident of falling of a cement block took place on 14 February, 2023 thereby taking two innocent lives.

5. The concern of the petitioner is that the petitioner's premises are adjoining and/or in the vicinity of respondent no. 2's premises being divided by a compound wall. We are shown a aerial photograph showing the proximity respondent no. 2's building under construction and the petitioner's building. The petitioner's building is stated to be about 20 metres away from the site of respondent no. 2. The activity of crane as used by respondent no. 2, which is at a far greater height and in the open sky, is in such physical position, of adversely affecting and/or in a given situation of being dangerous to the residents of the petitioner's premises and/or persons who are visiting the petitioner's premises. The petitioner contends that once the operation of the crane takes place at such massive height, there are number of facets which are required to be taken into consideration in regard to the overall safety requirements, so that the incidents of such nature do not happen, by objects falling on persons who are on the ground, in the surrounding areas.

6. Mr. Seksaria, learned senior counsel for the petitioner has fairly stated that the intention of the petitioner, is not in any manner to cause an impediment to the construction of the respondent no. 2's project. He fairly states that the concern of the petitioner is in regard to the appropriate safety measures which are required to be adopted by respondent no. 2 in undertaking operations of the crane, which is in the interest of all the stakeholders and the safety of the people at large. It is in this context, Mr. Seksaria has drawn the

Court's attention to the substantive prayers as made in the petition. It will be appropriate to note the substantive prayers as made in the petition, which reads thus:

"(a) that this Hon'ble Court be pleased to issue a Writ of Mandamus or any other appropriate Writ to command respondent no. 1, its officers to direct/compel the respondent no. 2 to undertake construction of the Project known as "Four Seasons Private Residences" on all that piece and parcel of land bearing Plot No. 00, C.T.S. No. 1H/136 admeasuring 4369 square meters, Division Lower Parel, Dr. E. Moses Road, Mumbai 400 018 to follow the safety norms/regulations contained in the Building permissions accorded by the respondent no. 1 as well under the prevalent development control regulation until the respondent no. 2 ensures total safety of the petitioner's members from any harm/damage/injury of their lives/property and/or the plot and vicinity thereof to the satisfaction of this Hon'ble Court.

(b) That this Hon'ble Court be pleased to direct respondent no. 1 to restrain respondent no. 2, its agents, officers, servants, any person and/or entity claiming through or under it from constructing and/or continuing to construct the Project known as "Four Seasons Private Residences" on all that piece and parcel of land bearing Plot No. 00, C.T.S. No. 1H/136 admeasuring 4369 square meters, Division Lower Parel, Dr. E. Moses Road, Mumbai - 400 018 undertaken by the respondent no. 2 in disregard/violation of the safety norms/regulations contained in the Building permission accorded by the respondent no. 1 as well under the prevalent development control regulation until the respondent no. 2 ensures total safety of the petitioner's members from any harm/damage/injury of their lives/property and/or the plot and vicinity thereof to the satisfaction of this Hon'ble Court."

7. On the other hand, Mr. Andhyarujina, learned senior counsel for respondent no. 2, at the outset, would submit that the incident of 14 February, 2023 was an accident. He submits that such incident ought not to have happened and that, there can be no bigger sorrow and pain which respondent no. 2 has felt in the happening of such fateful incident. Mr. Andhyarujina would submit that the endeavour of respondent no. 2 is to take all precautions

and adhere to safety measures of all kind in undertaking the balance construction of the building in question. He has fairly stated that his clients are prepared to adopt all safety norms and strictly adhere to the rules and regulations in undertaking the construction, so that no nuisance thereof is caused to the residents of the petitioner's building or to the persons in the vicinity or to the third parties who are likely to get affected in the event any object falls from such high-rise construction being undertaken by respondent no. 2.

8. Mr. Walawalkar, learned senior counsel for the Municipal Corporation has also made brief submissions. He would agree to the fact that certainly these are specialized category of constructions and for which an independent thought in regard to the safety measures, in relation to the cranes being installed and its operation are required to be considered in the interest of safety of human lives and property, which need to be prescribed by the Municipal Corporation. He submits that the Municipal Corporation is certainly willing to look into all such issues which are immensely in public interest more so in regard to contemporary constructions.

9. Having heard learned counsel for the parties and having perused the materials as placed on record, at the outset, with quite a wrench we observe that the incident of 14 February, 2023, was too unfortunate to say the least. It can

never be countenanced that innocent lives are lost even by accidents of such nature caused by objects falling from a suspended crane located at an enormous height, which a person on the ground may ordinarily not notice, as the one installed at the site of respondent no. 2. We are deeply pained to note such incident, we hope that none of the high-rise constructions in the city of Mumbai should make people vulnerable and prone to such accidents, in which innocent people would get hurt or lose their lives. We firmly believe that a right of a person to move freely, in places which are not actual construction sites, if are threatened by a fear of being killed or hurt, this would certainly amount to violation of one's fundamental right to livelihood, guaranteed under Article 21 of the Constitution.

10. Be that as it may, getting wiser from the recent incident, there is a need to urgently think on measures and solutions for all times to come and not let such incidents happen in relation to constructions of such nature, either on the site of respondent no. 2 or anywhere else. We find that constructions of such nature being specialized, seem to be routinely undertaken by use of large cranes hanging/suspended in the air. It is high time that the Municipal Corporation gives special attention to the safety requirements in this regard. The use of cranes is a technique/tool being adopted in undertaking such construction. It is used for carrying materials to different levels of the high-rise construction like

lifting of large glass panels, cement blocks and strong concrete materials etc. It is common sight in the city of Mumbai that several high-rise buildings under construction have large suspended cranes.

11. The question, therefore, is whether there is any inspection, approval and certification of the operation of such cranes by any recognized specialized agency which may be appointed by the developers. As seen from the present case, it is not the developer who has any inhouse mechanism to install such cranes. Mr. Andhyarujina states that respondent no. 2 had appointed a contractor for such work, who in turn appointed a sub-contractor to operate the cranes. It appears that these are not the agencies which are strictly under any specific statutory control of the Planning Authority. As to whether these agencies are certified agencies is also another question to be looked into by the Planning Authority. As to what are the norms of safety and/or precautions, required to be implemented in undertaking such constructions, so that they do not affect those who are outside the construction site, i.e., in the adjoining land/premises or on the public road, in the vicinity is an important aspect which would be required to be taken into consideration.

12. There may be several other issues which may concern the norms of safety to be met and complied by such contractors/operators. We, however, leave all these issues to be considered by the Planning Authority in a manner

which it may deem fit and proper and as may be permissible in law. We are certain that the Municipal Commissioner would look into these issues so that appropriate directives/guidelines in this regard are issued to be made applicable to the ongoing constructions of such nature and that the constructions sites are monitored.

13. Insofar as the present proceedings are concerned, on the backdrop of what has happened earlier in the year 2020 as also the recent incident, learned counsel for the parties are agreeable that the following mechanism would create a sense of confidence and assurance on the safety measures to be followed in respondent no. 2 undertaking the balance construction, till the time use of the crane is no more required. The following arrangement shall operate till the use of the crane and/or such appropriate construction is complete:

(i) A committee comprising of Mr. Amol Shetgri, and Mr. P.G. Redekar, Architects and Structural Engineers; a Senior Technical officer (to be nominated by the Municipal Commissioner) along with two representatives of the petitioner and two representatives of respondent no. 2, is constituted to formulate and implement safety norms in the interest of the petitioner and third parties, in respondent no. 2 undertaking the balance construction of its high-rise project, in using a large suspended crane.

(ii) The Municipal Commissioner shall nominate the concerned officer by 13 March, 2023.

(iii) The Committee shall have periodical meetings as may be mutually fixed. Each of the meetings shall be minuted, *inter alia* in regard to the activities in relation to the operation of the crane, all possible safety measures to be adopted, the timings of such

operation etc, to be implemented in the interest of all the stakeholders by respondent no. 2.

(iv) The Committee shall remain in operation till it is dissolved by mutual consent of the parties after the works are complete.

(v) In the meantime, within a period of two months from today, the Municipal Corporation shall look into issues *interalia* concerning safety measures in the operation and use of cranes in high rise constructions, including after having inputs of its representative being nominated by the Municipal Commissioner on the said Committee, so that appropriate directives/guidelines in a manner as permissible in law are issued, on all aspects in relation to installation, operation of cranes used in high-rise constructions.

14. We may clarify that all issues of expertise in relation to operations of the crane on the construction site of respondent no. 2, are left to be decided by the Committee being formed. Insofar as the framing of directives are concerned, it shall be within the exclusive domain of the Municipal Corporation, as the law may mandate. Our observations are only concerns expressed by us in the interest of safety of human life.

15. We are certain that in the event, the Municipal Corporation formulates any guidelines and intends to issue appropriate directives, the Urban Development Department of the State Government shall act upon any such proposal of the Municipal Corporation with utmost expediency. Considering

the urgency of the issue, we would expect the Secretary, Urban Development Department to pay special attention to such concern of the Corporation considering the larger public interest.

16. We disposed of the Writ Petition in the above terms. No costs.

17. Parties to act on the authenticated copy of this order.

(R.N. LADDHA, J.)

(G. S. KULKARNI, J.)

## Annexure 2

### Order of the Building Proposals Department

**BRIHANMUMBAI MUNICIPAL CORPORATION**

To,  
All Owner/ Developers &  
Architect/ Respective Professionals.

DYCHE/ 1326 / (B.P.) CITY dt. 15 SEP 2023

Sub: To take safety precautionary measures during on going Building  
Construction site to avoid mishap/ accident.

Sir,

In the recent times, incidences of collapse of material falling from top of the building on nearby residence / worker are occurring. It is seen that, various accidents / mishaps are occurring at on going construction sites, due to improper safety precautionary measures being adopted at sites such as not providing proper safety nets at various levels/ platforms, not using safety belts, not providing nuisance Screens all around proposed building, faulty tower crane etc.

Further, it is required to appoint safety officer on every construction site The instructions register of safety officer and his staff shall be maintained on site. The same shall be followed by all personals working on site. The safety officer shall also ascertain the compliances of his instructions.

It is to be mentioned here that, as per the provision of DCPR-2034 Clause 12(5) "It shall be the responsibility of the Owner/Developer and Respective Professionals on record appointed by Owner/Developer, to ensure that all necessary safety measures are taken on site and its immediate surroundings, especially in regard to workmen engaged, as directed in part-7, Constructional Practices & Safety, National Building Code of India, as amended up to date.

Grant of IOD/C.C/O.C or issuance of any written instructions to ensure public safety or reduce nuisance/ inconvenience does not render MCGM liable for any injury, damages or loss whatsoever that may be caused to anyone in and around the construction area/ site."

You are, therefore, hereby instructed, to ascertain that all safety precautionary measures are being followed at site time to time and shall also check the instructions of the concerns safety officer/ Technical Professionals to follow the safety precaution measures to avoid mishaps/ accident.

Please note that, in case of any accident/ mishaps, you will be held responsible and concern designated officer will be informed to issue stop work notice and to take further action as per law.

Please treat this as MOST Urgent.

Sd/-

Dy. Chief Engineer  
(Building Proposal) City

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## Annexure 3

### List of Codes Referred

The committee observed that various Indian Standards relevant to various aspects of cranes exist same are tabulated for ready reference.

Sr. No	IS code Details	Description
1.	IS 6521 (Part 1) – 1972, Bureau of Indian standards, Code of practice for design of Tower Cranes.	This Code covers power- driven cranes of tower type. The crane may be static or rail mounted. The travelling motion of the crane may or may not, however, be power- driven and the jib may or may not be derricked
2.	IS 3177: 1999, Bureau of Indian Standards, Code of practice for electric overhead travelling cranes and gantry cranes other than steel work cranes.	This code covers mechanical, electrical, inspection and testing requirements relating to the design, manufacturing and erection of electric overhead travelling cranes, portal and semi – portal cranes, single girder, double girder or mono-box type
3.	IS 13367 (part-1) – 1992, Bureau of Indian Standards, Code of practice for Safe use of cranes.	this code gives guidance for the safe use of all types of cranes and covers safe system of work, management, planning, general recommendations for the selection, installation, testing, operation and maintenance of cranes, selection of drivers, slingers and signallers.
4.	IS14470:1997, Bureau of Indian standard, Cranes test code and procedures.	This Code covers the operational specifications and capable of lifting rated loads, where rated loads are governed by stability, a test procedure and test loads are specified that permit stability margins to be easily verified. The following crane types are governed by-this Code: <ul style="list-style-type: none"> <li>a) overhead travelling cranes;</li> <li>b) travelling bridge cranes;</li> <li>c) portal cranes;</li> <li>d) mobile cranes and crane- excavators;</li> <li>e) tower cranes;</li> <li>f) railway cranes;</li> <li>g) cable cranes;</li> </ul>

In addition, Committee came across following international Codes & guidelines.

Sr. No	International code Details	Description
1.	BS 7121-1: 2016, British Standard, Code of practice for safe use of cranes	This part of BS 7121 Standard gives recommendations for the safe use of cranes permanently or temporarily installed in a work environment. This standard covers safe systems of work, selection, erection and dismantling, maintenance, inspection, thorough examination, operation, and the planning and management of lifting operations.
2.	AS 1418.6: 2004, Australian Standards, Cranes, hoists and winches Part 6: Guided storing and retrieving appliances	This Standard sets out requirements for guided storing and retrieving appliances of the storage and retrieval machine and universal stacker crane types.
3.	BS 14439: 2006, British Standard, Cranes: Safety: Tower Cranes	This European Standard specifies safety requirements for tower cranes. This European Standard applies to tower cranes for construction work, which are either erected by parts or self-erecting cranes.

The committee strongly recommends referring to good international practices where Indian Codes are not explicit about certain issue.

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## Annexure 4

### List of Other Literature Referred

- Occupational Safety and Health Act of 1970
- Tower Crane Code of Practice 2017 (PN12040), Queensland
- *ISO 23814:2009*, Cranes – Competency requirements for crane inspectors
- *ISO 4306* - establishes a vocabulary of the most commonly used terms in the field of cranes
- ASME B30.3 applies to “construction tower cranes” and “permanently mounted tower cranes”
- BS 7121-2 covers in-service inspection, maintenance, thorough examination and testing for the safe use of all types of cranes
- BS EN 13001-1:2015. Cranes. *General design*. General principles and requirements
- ISO 23814:2009 specifies the competency required for persons who carry out periodic and thorough inspections of cranes
- BMC Circular vide no CHE/DP/14449 Dated 15-9-23 and reproduced by CEO – SRA circular no 213, vide no SRA/CEO/Admin/632/2023 – dated 23-10-23 in Annexure 2

## **Annexure 5**

### **Sample Periodic Crane Inspection Reports (Checklists)**

**Sample Reports A, B, C, D and E** in the following pages

# Report Sample A : Daily Checklist

Section	Sub-Section	Checkpoint	Norm	Tools Used	Instruction	Compliance Score	Actual	Observation	Remarks	Photo Taken?	File Attachment?
Process Foundation	Documents	Check Validity Of Load Test Certificate	To Be Obtained From State Factory Inspector Approved Competent Person Photo Copy Of Competent Person Valid Registration Certificate Must Be Available At Site Certificate Validity Is One Year	Document	Check	0					
	Foundation & Under Carriage Part	Check Incoming Voltage At Main Switch	400 V (+ Or - 10%)	Clamp Meter	Check	0					
Jib	Main Jib & Trolley	Check Rope Receiving In Trolley Wire Rope Drum	One Rope Should Not Be Overlapped Improperly On Other. Wire Rope Drum Should Have At Least 3 Rolls Of Wire Rope Left Out	Visual	Check	0					
Jib	Main Jib & Trolley	Ensure Correct Functioning Of Trolley Brake	Proper Functioning	Visual	Check	0					
Jib	Main Jib & Trolley	Trolley Stop Limit Switch	0.1 M From The Jib Nose And 0.2 M From Foot Section Rubber Buffer	Visual	Check	0					
Jib	Main Jib & Trolley	Trolley Slow Limit Switch	3 To 5 M From The Jib Nose & Foot Section Rubber Buffer	Visual	Check	0					
Jib	Main Jib & Trolley	Condition Of Phot Arm Of Trolley	Should Be Free To Rotate	Visual	Check	0					
Jib	Main Jib & Trolley	Check Hook Block	Free Moving Pulley & Swivel. Properly Fitted Hook Latch, Availability Of Reflective Tape.	Visual	Check	0					
Jib	Main Jib & Trolley	Check Condition Of Swivel Block And Its Thrust Bearing Condition	No Damages Or Cracks To The Structure	Visual	Check	0					
Jib & Drive unit	Counter Jib & Hoist Winch	Check - Hoist Rope Size, Condition And Lubrication	Good Condition	Visual	Check	0					
Jib & Drive unit	Counter Jib & Hoist Winch	Check Rope Receiving In Hoist Wire Rope Drum	18 mm (4% Wear Allowed), 2 Cuts Allowed In 6D And 5 Cut Allowed In 30 D	Vernier Calliper	Check	0					
Jib & Drive unit	Counter Jib & Hoist Winch	Check Hoist Gear Oil Level	One Rope Should Not Be Improperly Overlapped On Other. Wire Rope Drum Should Have At Least 3 Rolls Of Wire Rope Left Out	Visual	Check	0					
Jib & Drive unit	Counter Jib & Hoist Winch	Check Correct Functioning Of Hoist Brake	Oil Should Be Available Till Centre Of Level Checking Glass	Visual	Check	0					
Jib & Drive unit	Counter Jib & Hoist Winch	Check Over Hoist Limit Switch	Hoist Operation Must Be Off 0.5 Meter(2 Fall) Or 1.5 Meter (4 Fall) Ago Below The Jib	Visual	Check	0					
Jib & Drive unit	Counter Jib & Hoist Winch	Check Under Hoist Limit Switch	Hoist Operation Must Be Off 0.5 Meter Above Ground	Visual	Check	0					
Jib & Drive unit	Counter Jib & Hoist Winch	Hoist Up Speed Reduction	4 M (2 Fall) Or 5 M (4 Fall) From The Jib	Visual	Check	0					
Slew	Slew Unit	Stewing Gearbox Oil Level	Should Be Visible In Level Glass	Visual	Check	0					
Slew	Slew Unit	Check Responsive Functioning Of Slew Braking	Proper Functioning	Visual	Check	0					
Slew	Slew Unit	Lubrication Of Slew Gear Tooth	Properly Lubricated	Visual	Check	0					
Slew	Slew Unit	Check Slew Bearing Greasing	Greased Periodically	Visual	Check	0					
Cabin & Tower Head	Cabin & Tower Head	Check Anemometer	Anemometer Must Be Available In Cabin	Visual	Check	0					
Cabin & Tower Head	Cabin & Tower Head	Check Moisture Absorber In Panel	Silica Jell Should Be Available In Panel	Visual	Check	0					
Cabin & Tower Head	Cabin & Tower Head	Check Cleanliness Of Panel	Panel Should Be Cleaned Periodically	Visual	Check	0					
Cabin & Tower Head	Cabin & Tower Head	Check Tightness Of Electrical Cable Connection	Tightness To Be Checked Periodically	Visual	Check	0					
Cabin & Tower Head	Cabin & Tower Head	Check Emergency Switch	It Must Be Available On Operator Control Board	Visual	Check	0					

Cabin & Tower Head	Cabin & Tower Head	Check All Operation	Every Step Of Joystick & Its Corresponding Speed Of Hoist, Slew, Trolley, Travel Must Be Working In The Respective Positions	Visual	Check					0			
Cabin & Tower Head	Cabin & Tower Head	Deadman Switch Of Joysticks	Crane Operations Should Not Be Started If Deadman Switch Not Activated Properly	Visual	Check					0			
Cabin & Tower Head	Cabin & Tower Head	Check Communication System Between Operator And Signalmen	Ensure Operator Dont Carry Mobile Phones. Walkie Talkie Should Be Available	Visual	Check					0			
Cabin & Tower Head	Cabin & Tower Head	Check Anti-Collision Device And Height Clearance Between Two Adjacent Crane	Clearance Between Lowest Element Of Height Crane (Hook In Upper Position, Counter Weight) And Upmost Element Of Other Crane Must Be Of 2 Mtr Minimum. Anti Collision Should Prevent The Collision Of Two Nearby Cranes.	Visual	Check					0			

# Report Sample B :

## Checklist after 250 Hours of Operation

Section	Sub-Section	Checkpoint	Norm	Tools Used	Instruction	Compliance Score	Actual Observation	Remarks	Photo Taken?	File Attachment?
Foundation	Foundation & Under Carriage Part	Check The Condition Of Mounting Bolts And Plate Washers Of Rails	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM	Visual	Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Rail Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Tower Crane Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Control Panel Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Lightning Arrestor Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Base Ballast Quantities And Locking Arrangement And Check Physical Condition	Base Ballasts Should Be Available In Accordance With Hook Height And Jib Length	Visual	Check	0				
Foundation	Foundation & Under Carriage Part	Check Physical Condition Of Travel Gear Box For Damages, Oil Seal Leakages, Breathers, Mounting Bolts And Washers		Visual	Inspect	0				
Foundation	Foundation & Under Carriage Part	Gear Oil Level	Should Be Available In Between High And Low Level Marks	Visual	Check	0				
Foundation	Foundation & Under Carriage Part	Check Condition Of Gear Oil	Last Replaced Interval Need To Be Checked	Visual	Check	0				
Foundation	Foundation & Under Carriage Part	Traveling Limit Switch	Traveling Operation Must Be Off One Meter Ago From Rail Stopper, And Good Physical Condition Of Limit Switch		Check	0				
Foundation	Foundation & Under Carriage Part	Size And Condition Of Incoming Power Cable	No Damages And Size Should Be Selected According To The Calculation	Visual	Inspect	0				
Foundation	Foundation & Under Carriage Part	Size And Condition Of Power Cable To Crane Top	No Damages And Size Should Be Selected According To The Calculation	Visual	Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Incoming Voltage At Main Switch	400 V (+ Or - 10%)	Clamp Meter	Inspect	0				
Mast	Mast Section	Check Physical Condition Of Mast Sections And Mounting Positions For Damages	No Damage	Visual	Inspect	0				
Mast	Mast Section	Check Nut Bolts Tightness And Condition	Torque Is Specified In OEM Manual	Torque Wrench	Check	0				
Mast	Mast Section	Check Pin(s) And Its Lock(s)	Right Pin & Lock Must Be Fitted At Right Place	Visual	Check	0				
Mast	Mast Section	Check The Physical Condition Of Climbing Collars, Connecting Pins And Bolts	Good Condition	Visual	Inspect	0				
Mast	Mast Section	Check Availability And Condition Of All Locking Wedges, Locking Plates And Bolts	Good Condition	Visual	Inspect	0				
Mast	Mast Section	Check Condition Of Climbing Collar Guide Plates	Good Condition	Visual	Inspect	0				
Mast	Mast Section	Check Floor Climbing Support	Climbing Support Must Be Done As Per Chimp Drawing, Bracket And I Beam Should Be In Good Condition.	Visual	Inspect	0				
Mast	Mast Section	Check Condition Of Ladder, Ladder Mounting Plates, Pins And Cotter Pin (Basic Mast & Standard Mast)	Good Condition	Visual	Inspect	0				

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for Working at Heights during High Rise Building Construction

Mast	Mast Section	Check Condition Of Platform, Platform Mounting Brackets And Bolts. Check Platform Handrails And Handrail Locking Pins (Basic Mast & Standard Mast)	Good Condition	Visual	Inspect	0			
Mast	Mast Section	Check Mast And Ladder Cleaning And Painting Status (Basic Mast & Standard Mast)	Cleaned And Painted	Visual	Inspect	0			
Mast	Mast Section	Check Condition Of Ladder And Fixing Of Mast Platforms	Ladder With Cage & Platform Should Be Fitted As Guidance By OEM. Operator Must Be Used Fall Arrestor During Ascending Or Descending On Ladder	Visual	Inspect	0			
Hydraulics	Hydraulic System	Check Hydraulic Oil Level	In-Between Up & Low Marked In Dipstick	Visual	Check	0			
Jib	Main Jib & Trolley	Check Pin And Split Pin Of Main Jib	Rust Should Not Be Available In Split Pin. Right Materials Must Be Fitted At Right Place	Visual	Check	0			
Jib	Main Jib & Trolley	Check The Physical Condition Of Main Jib For Any Physical Damages	No Damage	Visual	Inspect	0			
Jib	Main Jib & Trolley	Check Physical Condition Of Trolley	Good Condition	Visual	Inspect	0			
Jib	Main Jib & Trolley	Check All Pulley In Main Jib And Trolley	Free Moving Pulley & Bearing. Good Condition Of Bushes And Pins. According To The Calculation Pulley Dimensions Should Be Under Allowed Limits.	Sheeve Gauges	Check	0			
Jib	Main Jib & Trolley	Check Condition Of Two Fall / Four Fall Locking Arrangement	Good Condition	Visual	Check	0			
Jib	Main Jib & Trolley	Check - Trolley Rope Size, Condition And Lubrication	8 mm (5% Wear Allowed) , 5 Cuts Allowed In 60 And 10 Cut Allowed In 30 D	Vernier Caliper	Check & Lubricate	0			
Jib	Main Jib & Trolley	Check Rope Receiving In Trolley Wire Rope Drum	One Rope Should Not Be Overlapped Improperly On Other. Wire Rope Drum Should Have At Least 3 Rolls Of Wire Rope Left Out	Visual	Check	0			
Jib	Main Jib & Trolley	Inspect The Tighten Trolley Wire Rope Bull Dog Clamp Tightness		Visual	Check & Tighten	0			
Jib	Main Jib & Trolley	Clean The Ventilation Grid On The Motor From The Outside		Visual	Clean	0			
Jib	Main Jib & Trolley	Check Trolley Brake Linear Air Gap	0.3 To 0.9 mm	Visual	Check & Adjust	0			
Jib	Main Jib & Trolley	Ensure Correct Functioning Of Trolley Brake	Proper Functioning	Visual	Check	0			
Jib	Main Jib & Trolley	Check Condition Of Gear Oil	Good Condition	Visual	Check	0			
Jib	Main Jib & Trolley	Check Trolley/Luffing Gear Box Oil Level	Should Be Visible In Level Checking Glass 0.1 M From The Jib Nose And 0.2 M From Foot	Visual	Check	0			
Jib	Main Jib & Trolley	Trolley Stop Limit Switch	Section Rubber Buffer	Visual	Check	0			
Jib	Main Jib & Trolley	Trolley Slow Limit Switch	3 To 5 M From The Jib Nose & Foot Section Rubber Buffer	Visual	Check	0			
Jib	Main Jib & Trolley	Condition Of Pivot Arm Of Trolley	Should Be Free To Rotate	Visual	Check	0			
Jib	Main Jib & Trolley	Check Feeding Voltage To The Trolley/Luffing Motor	400 V (+ Or -10%)	Clamp Meter	Inspect	0			
Jib	Main Jib & Trolley	Check Condition Of Jib Nose, Wire Rope Swivel And Its Thrust Bearing	Free Moving & Greasing Bearing	Visual	Check	0			
Jib	Main Jib & Trolley	Check Hook Block	Free Moving Pulley & Swivel. Properly Fitted Hook Latch, Availability Of Reflective Tape. No Damages Or Cracks To The Structure	Visual	Check	0			
Jib	Main Jib & Trolley	Checking The Connection Between Cross-Member And Load Hook		Visual	Check	0			





Cabin & Tower Head	Cabin & Tower Head	Check Anti-Collision Device And Height Clearance Between Two Adjacent Crane Contamination And Sedimentary Depositions. Clean As Necessary. Visually Inspect The Weld Seams For Cracks.	Visual	Check	0						
Crane	General	Inspect The Steel Structure For Major Cracks.	Visual	Inspect	0						
Crane	General	Visually Inspect The Hole Clearance Of The Bolt Connections And Pin Connections. Remove Any Wear Of The Carbon Brushes From The Entire Slipping Assembly And Its Connection Points	Visual	Inspect	0						
Crane	General	Clean The Bearing Area Of The Slipping (No Circumstance On There)	Visual	Rectify	0						
Crane	General	Ensure Correct Fitting Of Cable Glands: Cable Glands Must Be Fastened Tightly And Locked	Visual	Clean	0						
Crane	General	Inspect The Cables: Cables Should Not Indicate Kinks Or Damage (E.G. Fractures...)	Visual	Check	0						
Crane	General	Grease All Moving Parts	Visual	Lubricate	0						
Process	Maintenance History	Last 250 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of Evident (Spares) Issued As Objective Evidence	Record	Check	0						
Process	Maintenance History	Last 500 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of Evident (Spares) Issued As Objective Evidence	Record	Check	0						
Process	Maintenance History	Last 1000 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of Evident (Spares) Issued As Objective Evidence	Record	Check	0						
Process	Maintenance History	Last 2000 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of Evident (Spares) Issued As Objective Evidence	Record	Check	0						
Process	Maintenance History	Last 3000 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of Evident (Spares) Issued As Objective Evidence	Record	Check	0						

# Report Sample C :

## Checklist after 500 Hours of Operation

Section	Sub-Section	Checkpoint	Norm	Tools Used	Instruction	Compliance Score	Actual	Observation	Remarks	Photo Taken?	File Attachment?
Foundation	Foundation & Under Carriage Part	Check The Condition Of Mounting Bolts And Plate Washers Of Rails		Visual	Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Rail Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0					
Foundation	Foundation & Under Carriage Part	Check tower Crane Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Control Panel Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Lightning Arrestor Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Base Ballast Quantities And Locking Arrangement And Check Physical Condition Length	Base Ballasts Should Be Available In Accordance With Hook Height And Jib Length	Visual	Check	0					
Foundation	Foundation & Under Carriage Part	Check Physical Condition Of Travel Gear Box For Damages, Oil Seal Leakages, Breathers, Mounting Bolts And Washers		Visual	Inspect	0					
Foundation	Foundation & Under Carriage Part	Gear Oil Level	Should Be Available In Between High And Low Level Marks	Visual	Check	0					
Foundation	Foundation & Under Carriage Part	Check Condition Of Gear Oil	Last Replaced Interval Need To Be Checked	Visual	Check	0					
Foundation	Foundation & Under Carriage Part	Traveling Limit Switch	Traveling Operation Must Be Off One Meter Ago From Rail Stopper, And Good Physical Condition Of Limit Switch		Check	0					
Foundation	Foundation & Under Carriage Part	Size And Condition Of Incoming Power Cable	No Damages And Size Should Be Selected According To The Calculation	Visual	Inspect	0					
Foundation	Foundation & Under Carriage Part	Size And Condition Of Power Cable To Crane Top	No Damages And Size Should Be Selected According To The Calculation	Visual	Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Availability Of Servo Stabilizer	Servo Stabilizer Is Must Be Connected	Visual	Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Incoming Voltage At Main Switch	400 V (+ Or - 10%)	Clamp Meter	Inspect	0					
Mast	Mast Section	Check Physical Condition Of Mast Sections And Mounting Positions For Damages	No Damage	Visual	Inspect	0					
Mast	Mast Section	Check Nut Bolts Tightness And Condition	Torque Is Specified In OEM Manual	Torque Wrench	Check	0					
Mast	Mast Section	Check Pin(s) And Its Lock(s)	Right Pin & Lock Must Be Fitted At Right Place	Visual	Check	0					
Mast	Mast Section	Collars, Connecting Pins And Bolts	Good Condition	Visual	Inspect	0					
Mast	Mast Section	Check Availability And Condition Of All Locking Wedges, Locking Plates And Bolts	Good Condition	Visual	Inspect	0					
Mast	Mast Section	Check Condition Of Climbing Collar Guide Plates	Good Condition	Visual	Inspect	0					
Mast	Mast Section	Check Floor Climbing Support	Climbing Support Must Be Done As Per Cmpc Drawing, Bracket And I Beam Should Be In Good Condition.	Visual	Inspect	0					
Mast	Mast Section	Check Condition Of Ladder, Ladder Mounting Plates, Pins And Conter Pin (Basic Mast & Standard Mast)	Good Condition	Visual	Inspect	0					

Mast	Mast Section	Check Condition Of Platform, Platform Mounting Brackets And Bolts. Check Platform Handrails And Handrail Locking Pins (Basic Mast & Standard Mast)	Visual	Inspect	0				
Mast	Mast Section	Check Mast And Ladder Cleaning And Painting Status (Basic Mast & Standard Mast)	Visual	Inspect	0				
Mast	Mast Section	Check Condition Of Ladder And Fixing Of Mast Platforms	Visual	Inspect	0				
Hydraulics	Hydraulic System	Check Hydraulic Oil Level	Visual	Check	0				
Jib	Main Jib & Trolley	Check Pin And Split Pin Of Main Jib	Visual	Check	0				
Jib	Main Jib & Trolley	Check The Physical Condition Of Main Jib For Any Physical Damages	Visual	Inspect	0				
Jib	Main Jib & Trolley	Check Physical Condition Of Trolley	Visual	Inspect	0				
Jib	Main Jib & Trolley	Check All Pulley In Main Jib And Trolley	Sheeve Guages	Check	0				
Jib	Main Jib & Trolley	Check Condition Of Two Fall / Four Fall Locking Arrangement	Visual	Check	0				
Jib	Main Jib & Trolley	Check - Trolley Rope Size, Condition And Lubrication	Vernier Caliper	Check & Lubricate	0				
Jib	Main Jib & Trolley	Check Rope Reeling In Trolley Wire Rope Drum	Visual	Check	0				
Jib	Main Jib & Trolley	Inspect The Tighten Trolley Wire Rope Bull Dog Clamp Tightness	Visual	Check & Tighten	0				
Jib	Main Jib & Trolley	Clean The Ventilation Grid On The Motor From The Outside	Visual	Clean	0				
Jib	Main Jib & Trolley	Check Trolley Brake Liner Air Gap	Visual	Check & Adjust	0				
Jib	Main Jib & Trolley	Ensure Correct Functioning Of Trolley Brake	Visual	Check	0				
Jib	Main Jib & Trolley	Check Condition Of Gear Oil	Visual	Check	0				
Jib	Main Jib & Trolley	Check Trolley/Luffing Gear Box Oil Level	Visual	Check	0				
Jib	Main Jib & Trolley	Trolley Stop Limit Switch	Visual	Check	0				
Jib	Main Jib & Trolley	Trolley Slow Limit Switch	Visual	Check	0				
Jib	Main Jib & Trolley	Condition Of Pivot Arm Of Trolley	Visual	Check	0				
Jib	Main Jib & Trolley	Check Feeding Voltage To The Trolley/Luffing Motor	Clamp Meter	Inspect	0				
Jib	Main Jib & Trolley	Check Condition Of Jib Nose, Wire Rope Swivel And Its Thrust Bearing	Visual	Check	0				
Jib	Main Jib & Trolley	Check Hook Block	Visual	Check	0				
Jib	Main Jib & Trolley	Checking The Connection Between Cross-Member And Load Hook	Visual	Check	0				



Stew	Slew Unit	Check Slew Bearing Nut Bolts Tightness Check Flat Top Unit For Any Physical Damages	ISO 7412 / Din 6914 = 1327 Nm, If Bolt Strength Rating ISO 4014 / Din 931, ISO 4017 / Din 933, ISO 4762 / Din 912 = 1079 Nm	Torque Wrench	Inspect	0			
Cabin & Tower Head	Cabin & Tower Head	Check The Condition Of Counter Jib Rope Pulley, Slewing Platform Rope Pulley, Overload Protection Pulley, Trolley Rope Pulley And Bottom Rope Pulley.	No Damage	Visual	Inspect	0			
Cabin & Tower Head	Cabin & Tower Head		Good Condition	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Pulley For Wear And Tear	According To The Calculation Pulley Dimensions Should Be Under Allowed Limits LA Must Be Available At The Top Of Cat Head Or Tower Head. Its Height Should Be One Meter Above The Crane Top. Cable Should Be 35 Sq mm	Sheeve Gauges	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Lightning Arrestor (L-A)	Aviation Lamp Must Be Fitted At Top Of The Cat Head/Tower Head Its Height Should Be Less Than LA Height Aviation Lamps Are Also To Be Fitted At The End Of Main Jib & Counter Jib	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Aviation Lamp	Free Moving Pulley	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check All Pulley in Tower Head	Glass Should Not Be Broken Wiper Should Be Available In Front Glass Water Should Not Enter Inside Cabin Due To Improper Fitting These Items	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Front & Side Glass And Front Door	Silica Jell Should Be Available In Panel	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Moisture Absorber In Panel	Panel Should Be Cleaned Periodically	Visual	Clean	0			
Cabin & Tower Head	Cabin & Tower Head	Check Cleaness Of Panel	Tightness To Be Checked Periodically	Visual	Check & Tighten	0			
Cabin & Tower Head	Cabin & Tower Head	Check Tightness Of Electrical Cable Connection	All Parts In Good Condition	Visual	Check & Clean	0			
Cabin & Tower Head	Cabin & Tower Head	Check The Condition Of All Contactors, Slewing And Trolley Electronic Block	Right Pins Available At Right Place	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check The Cabin Mounting Pin And Collar Pins	It Must Be Available On Operator Control Board	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Emergency Switch	It Must Be Available In Cabin	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Availability Of Fire Extinguisher And Hooter	Every Step Of Joystick & Its Corresponding Speed Of Hoist, Slew, Trolley, Travel Must Be Working In The Respective Positions	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check All Operation	Crane Operations Should Not Be Started If Deadman Switch Not Activated Properly	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Deadman Switch Of Joysticks	Over Load Limit Switch Will Be Trip Hoist Motor If Load Is More Than Maximum Load At Specify Jib Length. Load Moment Switch Will Trip The Hoist Or Trolley Motor If Load Moment Is More At Specify Jib L. Sli Working In Proper Condition	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Sli And Check Over Load And Load Moment Switch		Visual	Check	0			

Cabin & Tower Head	Cabin & Tower Head	Check Anti-Collision Device And Height Clearance Between Two Adjacent Crane	Clearance Between Lowest Element Of Height Crane (Hook In Upper Position, Counter Weight) And Upmost Element Of Other Crane Must Be Of 2 Mtr Minimum. Anti Collision Should Prevent The Collision Of Two Nearby Cranes.	Visual	Check	0					
Crane	General	Inspect The Steel Structure For Major Contamination And Sedimentary Depositions. Clean As Necessary.		Visual	Inspect	0					
Crane	General	Visually Inspect The Weld Seams For Cracks.		Visual	Inspect	0					
Crane	General	Visually Inspect The Hole Clearance Of The Bolt Connections And Pin Connections.		Visual	Inspect	0					
Crane	General	Remove Any Wear Of The Carbon Brushes From The Entire Slipping Assembly And Its Connection Points		Visual	Rectify	0					
Crane	General	Clean The Bearing Area Of The Slipping (No Circumstance On There)		Visual	Clean	0					
Crane	General	Ensure Correct Fitting Of Cable Glands: Cable Glands Must Be Fastened Tightly And Locked		Visual	Check	0					
Crane	General	Inspect The Cables: Cables Should Not Indicate Kinks Or Damage (E.G. Fractures....)		Visual	Check	0					
Crane	General	Grease All Moving Parts		Visual	Lubricate	0					
Process	Maintenance History	Last 250 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of E-Ident (Spares) Issued As Objective Evidence	Check EIP Data For Maintenance Carried Out & Spares Issued	Record	Check	0					
Process	Maintenance History	Last 500 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of E-Ident (Spares) Issued As Objective Evidence	Check EIP Data For Maintenance Carried Out & Spares Issued	Record	Check	0					
Process	Maintenance History	Last 1000 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of E-Ident (Spares) Issued As Objective Evidence	Check EIP Data For Maintenance Carried Out & Spares Issued	Record	Check	0					
Process	Maintenance History	Last 2000 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of E-Ident (Spares) Issued As Objective Evidence	Check EIP Data For Maintenance Carried Out & Spares Issued	Record	Check	0					

# Report Sample D :

## Checklist after 1000 Hours of Operation

Section	Sub-Section	Checkpoint	Norm	Tools Used	Instruction	Compliance Score	Actual Observation	Remarks	Photo Taken?	File Attachment?
Foundation	Foundation & Under Carriage Part	Check The Condition Of Mounting Bolts And Plate Washers Of Rails		Visual	Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Rail Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Tower Crane Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Control Panel Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Lightning Arrestor Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Base Ballast Quantities And Locking Arrangement And Check Physical Condition	Base Ballasts Should Be Available In Accordance With Hook Height And Jib Length	Visual	Check	0				
Foundation	Foundation & Under Carriage Part	Check Physical Condition Of Travel Gear Box For Damages, Oil Seal Leakages, Breathers, Mounting Bolts And Washers		Visual	Inspect	0				
Foundation	Foundation & Under Carriage Part	Gear Oil Level	Should Be Available In Between High And Low Level Marks	Visual	Check	0				
Foundation	Foundation & Under Carriage Part	Check Condition Of Gear Oil	Last Replaced Interval Need To Be Checked	Visual	Check	0				
Foundation	Foundation & Under Carriage Part	Traveling Limit Switch	Traveling Operation Must Be Off One Meter Ago From Rail Stopper. And Good Physical Condition Of Limit Switch		Check	0				
Foundation	Foundation & Under Carriage Part	Size And Condition Of Incoming Power Cable	No Damages And Size Size Should Be Selected According To The Calculation	Visual	Inspect	0				
Foundation	Foundation & Under Carriage Part	Size And Condition Of Power Cable To Crane Top	No Damages And Size Size Should Be Selected According To The Calculation	Visual	Inspect	0				
Foundation	Foundation & Under Carriage Part	Check Availability Of Servo Stabilizer	Servo Stabilizer Is Must Be Connected	Visual	Check	0				
Foundation	Foundation & Under Carriage Part	Check Incoming Voltage At Main Switch	400 V (+ Or - 10%)	Clamp Meter	Inspect	0				
Mast	Mast Section	Check Physical Condition Of Mast Sections And Mounting Positions For Damages	No Damage	Visual	Inspect	0				
Mast	Mast Section	Check Nut Bolts Tightness And Condition	Torque Is Specified In OEM Manual	Torque Wrench	Check	0				
Mast	Mast Section	Check Pin(s) And Its Lock(s)	Right Pin & Lock Must Be Fitted At Right Place	Visual	Check	0				
Mast	Mast Section	Check The Physical Condition Of Climbing Collars, Connecting Pins And Bolts	Good Condition	Visual	Inspect	0				
Mast	Mast Section	Check Availability And Condition Of All Locking Wedges, Locking Plates And Bolts	Good Condition	Visual	Inspect	0				
Mast	Mast Section	Check Condition Of Climbing Collar Guide Plates	Good Condition	Visual	Inspect	0				
Mast	Mast Section	Check Floor Climbing Support	Climbing Support Must Be Done As Per Comp Drawing. Bracket And I Beam Should Be In Good Condition.	Visual	Inspect	0				
Mast	Mast Section	Check Condition Of Ladder, Ladder Mounting Plates, Pins And Cotter Pin (Basic Mast & Standard Mast)	Good Condition	Visual	Inspect	0				

Mast		Check Condition Of Platform, Platform Mounting Brackets And Bolts. Check Platform Handrails And Handrail Locking Pins (Basic Mast & Standard Mast)	Good Condition	Visual	Inspect	0				
Mast		Check Mast And Ladder Cleaning And Painting Status (Basic Mast & Standard Mast)	Cleaned And Painted	Visual	Inspect	0				
Mast		Check Condition Of Ladder And Fixing Of Mast Platforms	Ladder With Cage & Platform Should Be Fitted As Guidance By OEM. Operator Must Be Used Fall Arrestor During Ascending Or Descending On Ladder	Visual	Inspect	0				
Hydraulics		Check Hydraulic Oil Level	In-Between Up & Low Marked In Dipstick	Visual	Check	0				
Jib		Check Pin And Split Pin Or Main Jib	Rust Should Not Be Available In Split Pin. Right Materials Must Be Fitted At Right Place	Visual	Check	0				
Jib		Check The Physical Condition Of Main Jib For Any Physical Damages	No Damage	Visual	Inspect	0				
Jib		Check Physical Condition Of Trolley	Good Condition	Visual	Inspect	0				
Jib		Check All Pulley In Main Jib And Trolley	Free Moving Pulley & Bearing. Good Condition Of Bushes And Pins. According To The Calculation Pulley Dimensions Should Be Under Allowed Limits.	Sheeve Guages	Check	0				
Jib		Check Condition Of Two Fall / Four Fall Locking Arrangement	Good Condition	Visual	Check	0				
Jib		Check - Trolley Rope Size, Condition And Lubrication	8 mm (5% Wear Allowed) - 5 Cuts Allowed In 6D And 10 Cut Allowed In 30 D	Vernier Calliper	Check & Lubricate	0				
Jib		Check Rope Reeving In Trolley/Wire Rope Drum	One Rope Should Not Be Overlapped Improperly On Other. Wire Rope Drum Should Have At Least 3 Rolls Of Wire Rope Left Out	Visual	Check	0				
Jib		Inspect The Trolley Wire Rope Bull Dog Clamp Tightness		Visual	Check & Tighten	0				
Jib		Clean The Ventilation Grid On The Motor From The Outside		Visual	Clean	0				
Jib		Check Trolley Brake Liner Air Gap	0.3 To 0.9 mm	Visual	Check & Adjust	0				
Jib		Ensure Correct Functioning Of Trolley Brake	Proper Functioning	Visual	Check	0				
Jib		Check Condition Of Gear Oil	Good Condition	Visual	Check	0				
Jib		Check Trolley/Luffing Gear Box Oil Level	Should Be Visible In Level Checking Glass	Visual	Check	0				
Jib		Trolley Stop Limit Switch	0.1 M From The Jib Nose And 0.2 M From Foot Section Rubber Buffer	Visual	Check	0				
Jib		Trolley Slow Limit Switch	3 To 5 M From The Jib Nose & Foot Section Rubber Buffer	Visual	Check	0				
Jib		Condition Of Pivot Arm Of Trolley	Should Be Free To Rotate	Visual	Check	0				
Jib		Check Feeding Voltage To The Trolley/Luffing Motor	400 V (+ Or - 10%)	Clamp Meter	Inspect	0				
Jib		Check Condition Of Jib Nose, Wire Rope Swivel And Its Thrust Bearing	Free Moving & Greasing Bearing	Visual	Check	0				
Jib		Check Hook Block	Free Moving Pulley & Swivel. Properly Fitted Hook Latch. Availability Of Reflective Tape. No Damages Or Cracks To The Structure	Visual	Check	0				
Jib		Checking The Connection Between Cross-Member And Load Hook		Visual	Check	0				



Slew	Slew Unit	Check Slew Bearing Nut Bolts Tightness Check Flat Top Unit For Any Physical Damages	ISO 7412 / Din 6914 = 1327 Nm, If Bolt Strength Rating ISO 4014 / Din 931, ISO 4017 / Din 933, ISO 4762 / Din 912 = 1079 Nm	Torque Wrench	Inspect	0			
Cabin & Tower Head	Cabin & Tower Head	Check The Condition Of Counter Jib Rope Pulley, Slewing Platform Rope Pulley, Overload Protection Pulley, Trolley Rope Pulley And Bottom Rope Pulley.	No Damage	Visual	Inspect	0			
Cabin & Tower Head	Cabin & Tower Head		Good Condition	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Pulley For Wear And Tear	According To The Calculation Pulley Dimensions Should Be Under Allowed Limits LA Must Be Available At The Top Of Cat Head Or Tower Head. Its Height Should Be One Meter Above The Crane Top. Cable Should Be 35 Sq mm	Sheeve Gauges	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Lightning Arrestor (LA)	Aviation Lamp Must Be Fitted At Top Of The Cat Head/Tower Head Its Height Should Be Less Than LA Height Aviation Lamps Are Also To Be Fitted At The End Of Main Jib & Counter Jib	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Aviation Lamp	Free Moving Pulley	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check All Pulley In Tower Head	Glass Should Not Be Broken Wiper Should Be Available In Front Glass Water Should Not Enter Inside Cabin Due To Improper Fitting These Items	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Front & Side Glass And Front Door	Silica Jell Should Be Available In Panel	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Moisture Absorber In Panel	Panel Should Be Cleaned Periodically	Visual	Clean	0			
Cabin & Tower Head	Cabin & Tower Head	Check Cleanmess Of Panel	Tightness To Be Checked Periodically	Visual	Check & Tighten	0			
Cabin & Tower Head	Cabin & Tower Head	Check Tightness Of Electrical Cable Connection	All Parts In Good Condition	Visual	Check & Clean	0			
Cabin & Tower Head	Cabin & Tower Head	Check The Condition Of All Contactors, Slewing And Trolley Electronic Block	Right Pins Available At Right Place	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check The Cabin Mounting Pin And Collar Pins	It Must Be Available On Operator Control Board	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Emergency Switch	It Must Be Available In Cabin	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Availability Of Fire Extinguisher And Hooter	Every Step Of Joystick & Its Corresponding Speed Of Hoist, Slew, Trolley, Travel Must Be Working In The Respective Positions	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check All Operation	Crane Operations Should Not Be Started If Deadman Switch Not Activated Properly	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Deadman Switch Of Josticks	Over Load Limit Switch Will Be Trip Hoist Motor If Load Is More Than Maximum Load At Specify Jib Length. Load Moment Switch Will Trip The Hoist Or Trolley Motor If Load Moment Is More At Specify Jib L. Still Working In Proper Condition	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Sli And Check Over Load And Load Moment Switch		Visual	Check	0			

Cabin & Tower Head	Cabin & Tower Head	Check Anti-Collision Device And Height Clearance Between Two Adjacent Crane	Clearance Between Lowest Element Of Height Crane (Hook In Upper Position, Counter Weight) And Upmost Element Of Other Crane Must Be Of 2 Mtr Minimum. Anti Collision Should Prevent The Collision Of Two Nearby Cranes.	Visual	Check	0				
Crane	General	Inspect The Steel Structure For Major Contamination And Sedimentary Depositions. Clean As Necessary.		Visual	Inspect	0				
Crane	General	Visually Inspect The Weld Seams For Cracks.		Visual	Inspect	0				
Crane	General	Visually Inspect The Hole Clearance Of The Bolt Connections And Pin Connections.		Visual	Inspect	0				
Crane	General	Remove Any Wear Of The Carbon Brushes From The Entire Slipping Assembly And Its Connection Points		Visual	Rectify	0				
Crane	General	Clean The Bearing Area Of The Slipping (No Circumstance On There)		Visual	Clean	0				
Crane	General	Ensure Correct Fitting Of Cable Glands: Cable Glands Must Be Fastened Tightly And Locked		Visual	Check	0				
Crane	General	Inspect The Cables; Cables Should Not Indicate Kinks Or Damage (E.G. Fractures...)		Visual	Check	0				
Crane	General	Grease All Moving Parts		Visual	Lubricate	0				
Process	Maintenance History	Last 250 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of E-Ident (Spares) Issued As Objective Evidence	Check EIP Data For Maintenance Carried Out & Spares Issued	Record	Check	0				
Process	Maintenance History	Last 500 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of E-Ident (Spares) Issued As Objective Evidence	Check EIP Data For Maintenance Carried Out & Spares Issued	Record	Check	0				
Process	Maintenance History	Last 1000 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of E-Ident (Spares) Issued As Objective Evidence	Check EIP Data For Maintenance Carried Out & Spares Issued	Record	Check	0				
Process	Maintenance History	Last 2000 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of E-Ident (Spares) Issued As Objective Evidence	Check EIP Data For Maintenance Carried Out & Spares Issued	Record	Check	0				

# Report Sample E :

## Checklist after 2000 Hours of Operation

Section	Sub-Section	Checkpoint	Norm	Tools Used	Instruction	Compliance Score	Actual	Observation	Remarks	Photo Taken?	File Attachment?
Foundation	Foundation & Under Carriage Part	Check The Condition Of Mounting Bolts And Plate Washers Of Rails	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM	Visual	Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Rail Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Tower Crane Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Control Panel Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Lightning Arrestor Earthing	Double Earthing By 50X6 mm GI Flat, Resistance Value Should Be Less Than 1 OHM		Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Base Ballast Quantities And Locking Arrangement And Check Physical Condition	Base Ballasts Should Be Available In Accordance With Hook Height And Jib Length	Visual	Check	0					
Foundation	Foundation & Under Carriage Part	Check Physical Condition Of Travel Gear Box For Damages, Oil Seal Leakages, Breathers, Mounting Bolts And Washers		Visual	Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Condition Of Gear Oil	Last Replaced Interval Need To Be Checked	Visual	Replace	0					
Foundation	Foundation & Under Carriage Part	Traveling Limit Switch	Traveling Operation Must Be Off One Meter Ago From Rail Stopper, And Good Physical Condition Of Limit Switch		Check	0					
Foundation	Foundation & Under Carriage Part	Size And Condition Of Incoming Power Cable	No Damages And Size Should Be Selected According To The Calculation	Visual	Inspect	0					
Foundation	Foundation & Under Carriage Part	Size And Condition Of Power Cable To Crane Top	No Damages And Size Should Be Selected According To The Calculation	Visual	Inspect	0					
Foundation	Foundation & Under Carriage Part	Check Availability Of Servo Stabilizer	Servo Stabilizer Is Must Be Connected	Visual	Check	0					
Foundation	Foundation & Under Carriage Part	Check Incoming Voltage At Main Switch	400 V (+ Or - 10%)	Clamp Meter	Inspect	0					
Mast	Mast Section	Check Physical Condition Of Mast Sections And Mounting Positions For Damages	No Damage	Visual	Inspect	0					
Mast	Mast Section	Check Nut Bolts Tightness And Condition	Torque Is Specified In OEM Manual	Torque Wrench	Check	0					
Mast	Mast Section	Check Pin(s) And Its Lock(s)	Right Pin & Lock Must Be Fitted At Right Place	Visual	Check	0					
Mast	Mast Section	Check The Physical Condition Of Climbing Collars, Connecting Pins And Bolts	Good Condition	Visual	Inspect	0					
Mast	Mast Section	Check Availability And Condition Of All Locking Wedges, Locking Plates And Bolts	Good Condition	Visual	Inspect	0					
Mast	Mast Section	Check Condition Of Climbing Collar Guide Plates	Good Condition	Visual	Inspect	0					
Mast	Mast Section	Check Floor Climbing Support	Climbing Support Must Be Done As Per Crmpc Drawing, Bracket And I Beam Should Be In Good Condition.	Visual	Inspect	0					
Mast	Mast Section	Check Condition Of Ladder, Ladder Mounting Plates, Pins And Center Pin (Basic Mast & Standard Mast)	Good Condition	Visual	Inspect	0					
Mast	Mast Section	Check Condition Of Platform, Platform Mounting Brackets And Bolts, Check Platform Handrails And Handrail Locking Pins (Basic Mast & Standard Mast)	Good Condition	Visual	Inspect	0					



Jib & Drive unit	Counter Jib & Hoist Winch	Check Counter Weight Quantities, Locking Arrangement And Current Configuration	As Per The Crane Specifications	Visual	Check	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Check Physical Condition Of Counter Jib	Good Condition	Visual	Inspect	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Check Tie Rod, Counter Jib Fixing Pin And Split Pin	Rust Should Not Be Available In Split Pin Place. Reiter OEM Manual	Visual	Check	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Check - Hoist Rope Size, Condition And Lubrication	18 mm (4% Wear Allowed), 2 Cuts Allowed In 6D And 5 Cut Allowed In 30 D	Vernier Caliper	Check & Lubricate	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Check Rope Reaving In Hoist Wire Rope Drum	One Rope Should Not Be Improperly Overlapped On Other. Wire Rope Drum Should Have At Least 3 Rolls Of Wire Rope Left Out	Visual	Check	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Inspect & Tighten Hoist Wire Rope Wedge Lock And Bull Dog Camp Tightness		Visual	Check	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Check The Condition Of Gear Oil	Good Condition	Visual	Replace	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Lubrication Of Hoist Gear Motor		Visual	Lubricate	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Clean The Ventilation Grid On The Motor From The Outside		Visual	Clean	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Check Hoist Brake Liner Air Gap	0.5 mm To 1.1 mm	Feeler Gauge	Check & Adjust	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Check Feeding Voltage To The Hoist Motor	400 V (+ Or - 10%)	Clamp Meter	Inspect	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Check Over Hoist Limit Switch	Hoist Operation Must Be Off 0.5 Meter(2 Fall) Or 1.5 Meter (4 Fall) Ago Below The Jib	Visual	Check	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Check Under Hoist Limit Switch	Hoist Operation Must Be Off 0.5 Meter	Visual	Check	0				
Jib & Drive unit	Counter Jib & Hoist Winch	Hoist Up Speed Reduction	Above Ground 4 M (2 Fall) Or 5 M (4 Fall) From The Jib	Visual	Check	0				
Slew	Slew Unit	Check Feeding Voltage To The Swing Motor	400 V (+ Or - 10%)	Clamp Meter	Inspect	0				
Slew	Slew Unit	Check Condition Of Slew Gearbox Oil	Good Condition And Changed In Proper Interval	Visual	Replace	0				
Slew	Slew Unit	Check Slew Brake Liner Air Gap	0.5 To 1 mm	Feeler Gauge	Check & Adjust	0				
Slew	Slew Unit	Lubrication Of Slewing Gear Motor	Replace The Grease In Bearings	Visual	Replace	0				
Slew	Slew Unit	Clean The Ventilation Grid On The Motor From The Outside		Visual	Clean	0				
Slew	Slew Unit	Check Responsive Functioning Of Slew Braking	Proper Functioning	Visual	Check	0				
Slew	Slew Unit	Check Slew Gear For Smooth Operations	No Unwanted Noise	Visual	Check	0				
Slew	Slew Unit	Check For Proper Lubrication Of Slew Gear Inner Bearing And Check For Any Physical Damages To Bearing Seal		Visual	Lubricate	0				
Slew	Slew Unit	Check The Ladder For Proper Access To Cabin		Visual	Inspect	0				
Slew	Slew Unit	Lubrication Of Slew Gear Tooth	Properly Lubricated	Visual	Lubricate	0				
Slew	Slew Unit	Check The Backlash Of Slew Motor Pinion And Slew Gear Tooth	0.3 To 0.4 mm	Visual	Check	0				
Slew	Slew Unit	Check Slew Bearing Greasing	Greased Periodically	Visual	Check	0				
Slew	Slew Unit	Check Slew Bearing Nut Bolts Tightness	ISO 7412 / Din 6914 = 1327 Nm, If Bolt Strength Rating ISO 4014 / Din 931, ISO 4017 / Din 933, ISO 4762 / Din 912 = 1079 Nm	Torque Wrench	Inspect	0				
Slew	Slew Unit	Check Flat Top Unit For Any Physical Damages	No Damage	Visual	Inspect	0				

Cabin & Tower Head	Cabin & Tower Head	Check The Condition Of Counter Jib Rope Pulley , Slewing Platform Rope Pulley, Overload Protection Pulley, Trolley Rope Pulley And Bottom Rope Pulley.	Good Condition	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Pulley For Wear And Tear	According To The Calculation Pulley Dimensions Should Be Under Allowed Limits L.A Must Be Available At The Top Of Cat Head Or Tower Head. Its Height Should Be One Meter Above The Crane Top. Cable Should Be 35 Sq mm	Sheeve Gauges	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Lightning Arrestor (L.A)	Aviation Lamp Must Be Fitted At Top Of The Cat Head/Tower Head Its Height Should Be Less Than LA Height Aviation Lamps Are Also To Be Fitted At The End Of Main Jib & Counter Jib	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Aviation Lamp	Free Moving Pulley	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check All Pulley In Tower Head	Glass Should Not Be Broken Wiper Should Be Available In Front Glass Water Should Not Enter Inside Cabin Due To Improper Fitting. These Items	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Front & Side Glass And Front Door	Silica Jell Should Be Available In Panel	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Moisture Absorber In Panel	Panel Should Be Cleaned Periodically	Visual	Clean	0			
Cabin & Tower Head	Cabin & Tower Head	Check Cleanmess Of Panel	Tightness To Be Checked Periodically	Visual	Check & Tighten	0			
Cabin & Tower Head	Cabin & Tower Head	Check Tightness Of Electrical Cable Connection	All Parts In Good Condition	Visual	Check & Clean	0			
Cabin & Tower Head	Cabin & Tower Head	Check The Condition Of All Contactors, Slewing And Trolley Electronic Block	Right Pins Available At Right Place	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check The Cabin Mounting Pin And Collar Pins	It Must Be Available On Operator Control Board	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Emergency Switch	Every Step Of Joystick & Its Corresponding Speed Of Hoist, Slew, Trolley, Travel Must Be Working In The Respective Positions	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Availability Of Fire Extinguisher And Hooter	Crane Operations Should Not Be Started If Deadman Switch Not Activated Properly	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check All Operation	Over Load Limit Switch Will Be Trip Hoist Motor If Load Is More Than Maximum Load At Specify Jib Length. Load Moment Switch Will Trip The Hoist Or Trolley Motor If Load Moment Is More At Specify Jib L. Sli Working In Proper Condition	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Deadman Switch Of Joysticks	Clearance Between Lowest Element Of Height Crane (Hook In Upper Position, Counter Weight) And Upmost Element Of Other Crane Must Be Of 2 Mtr Minimum. Anti Collision Should Prevent The Collision Of Two Nearby Cranes.	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Check Sli And Check Over Load And Load Moment Switch	Check Anti-Collision Device And Height Clearance Between Two Adjacent Crane	Visual	Check	0			
Cabin & Tower Head	Cabin & Tower Head	Inspect The Steel Structure For Major Contamination And Sedimentary Depositions. Clean As Necessary.	Visually Inspect The Weld Seams For Cracks.	Visual	Inspect	0			
Crane	General			Visual	Inspect	0			
Crane	General			Visual	Inspect	0			

Crane	General	Visually Inspect The Hole Clearance Of The Bolt Connections And Pin Connections. Remove Any Wear Of The Carbon Brushes From The Entire Slipping Assembly And Its Connection Points	Visual	Inspect	0					
Crane	General	Clean The Bearing Area Of The Slipping (No Circumstance On There)	Visual	Rectify	0					
Crane	General	Ensure Correct Fitting Of Cable Glands: Cable Glands Must Be Fastened Tightly And Locked	Visual	Clean	0					
Crane	General	Inspect The Cables: Cables Should Not Indicate Kinks Or Damage (E.G. Fractures...)	Visual	Check	0					
Crane	General	Grease All Moving Parts	Visual	Check	0					
Crane	General	Last 250 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of Evidence (Spares) Issued As Objective	Visual	Lubricate	0					
Process	Maintenance History	Last 500 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of Evidence (Spares) Issued As Objective	Record	Check	0					
Process	Maintenance History	Last 1000 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of Evidence (Spares) Issued As Objective	Record	Check	0					
Process	Maintenance History	Last 2000 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of Evidence (Spares) Issued As Objective	Record	Check	0					
Process	Maintenance History	Last 2500 Hours Maintenance Carried Out? Enter HMR, Date & Take A Picture Of Evidence (Spares) Issued As Objective	Record	Check	0					

## **Annexure 6**

### **Minutes of the Safety Committee Meetings**

The following pages show the reproduction of the minutes of the meetings held by the safety committee.

**DATED:** 17<sup>TH</sup> MARCH 2023

**TIMING:** 11:00 A.M.

**VENUE:** FOUR SEASON RESIDENTIAL CLUB, WORLI, MUMBAI.

**PRESENT:**

1. Mr. Roshan Bhoir
2. Dr. Shashank Mehendale
3. Mr. Girish Dravid
4. Mr. Amol Shetgiri
5. Mr. P.G. Redekar
6. Mr. Vikraman Pillai
7. Mr. Mridul Sharma

**WHERE:**

- A. The meeting was attended by the aforesaid committee members at the given time and venue as mutually agreed amongst themselves.
- B. The committee members present in the meeting introduced themselves and shared their experience per se.
- C. The committee members were apprised with the Hon'ble Bombay High Court Order dated 9<sup>th</sup> March 2023 passed by His lordship Shri. G.S. Kulkarni J. and Shri. R.N. Laddha J. the same was read for the mutual understanding of all the members.
- D. During the meeting a comprehensive aspect pertaining to the frame work was discussed amongst the committee members where specific pointers and agenda were identified and the same need to be discussed in length for the formulation of the policy/norms as guided by the Hon'ble Bombay High Court in Order dated 9<sup>th</sup> March 2023.
- E. The committee members have agreed to prepare a specific agenda for the next meeting and the same shall be circulated amongst the Committee members accordingly.
- F. Meanwhile any present case, judgment, law, rules/regulations and/or notifications shall be shared on the main Whatsapp and/or email address provided by all the committee members so that the same can be read thoroughly before attending the next meeting.
- G. The committee members has mutually agreed for the next date of meeting on 24<sup>th</sup> March 2023 at 2:30 p.m. same venue.

The meeting ended with thanks to all the Committee Members.

## **MINUTES OF MEETING**

**DATED:** 24<sup>th</sup> MARCH 2023

**TIMING:** 03:00 P.M.

**VENUE:** FOUR SEASON RESIDENTIAL CLUB, WORLI, MUMBAI.

### **PRESENT:**

1. Mr. Roshan Bhoir
2. Dr. Shashank Mehendale
3. Mr. Girish Dravid (online)
4. Mr. Amol Shetgiri
5. Mr. P.G. Redekar
6. Mr. Vikraman Pillai
7. Mr. Mridul Sharma

### Points discussed;

- 1) The minutes dated 17<sup>th</sup> March 2023 was placed before the committee members, the same has been finalized.
- 2) Wrt to point 'F' of MOM dated 17<sup>th</sup> March 2023 Mr. Vikraman Pillai & Mr. P G Redekar circulated the IS code 13367 pertaining to safety norms usage of Tower Crane & OH & S documented information for erection, operation & dismantling of Tower crane.
- 3) The document presented is IS 13367 Part 1 1992 which was read & discussed. The IS Code is elaborate & covers major aspects related to crane safety. The committee noted that the said code has Parts 2 to 10. Since Part 4 covers Tower Cranes, it was decided that the committee would peruse the Part 4 of the said code in subsequent meetings.
- 4) The requirement of Safety Officers to be deputed on site, though insisted by Planning Authority during the Plan approval process, the role, responsibilities, qualification & licensing policy has to be spelled out in the IOD/approval granted by such authorities.
- 5) The committee members after perusing the document that is OH&S documented information for erection, operation & dismantling of Tower crane, felt that the same may be read with Part 4 of IS 13367.
- 6) The committee members has mutually agreed for the next date of meeting on 31<sup>st</sup> March 2023 at 4 p.m. same venue.

The meeting ended with thanks to all the Committee Members.

## MINUTES OF MEETING

**DATED:** 31<sup>st</sup> MARCH 2023

**TIMING:** 04:00 P.M.

**VENUE:** FOUR SEASON RESIDENTIAL CLUB, WORLI, MUMBAI.

**PRESENT:**

1. Mr. Roshan Bhoir
2. Dr. Shashank Mehendale
3. Mr. Girish Dravid
4. Mr. Amol Shetgiri
5. Mr. P.G. Redekar
6. Mr. Vikraman Pillai
7. Mr. Mridul Sharma

Points discussed;

- 5) The minutes dated 17<sup>th</sup> March 2023 & 24<sup>th</sup> March 2023 were placed before the committee members, the same has been finalized.
- 6) Dr. Shashank Mehendale has circulated copy of Code of Practice for Safe Use of Tower Cranes by Occupational Safety & Health Branch, Labour Department - HK. The said code provides for appointment of safety officer (10.2 attached as Annexure 1) as well as Safety Supervisor (10.4 attached as Annexure 2).

In the clause 9.3.2 of the said code title '**Proximity Hazards**'-

*“Tower cranes must be located so that there is at least 3m (10 feet) clearance between the end of boom and the nearest obstacle or building. In some situations, aircraft warning lights should be fitted to the top of tower cranes. As far as possible, tower cranes should be sited to avoid loads being handled over occupied premises, highways, the route of aerial ropeway, other construction works, or railways. The danger to or from underground services, such as gas mains or electric cables, should not be overlooked. Precautions should be taken to ensure that the tower crane standing is clear of any underground services. Where this is not possible, the services should be adequately protected to safeguard against any damage”.*

- 7) It was discussed that BS-7121 Part 5 of 2019 published on 30<sup>th</sup> Sept 2019 along with various other updates includes recommendation on preventing objects falling from Tower Crane. Therefore, discussed that said code should be shared before the next meeting.

- 8) Mr. Amol Shetgiri shared Workplace Health & Safety Queensland- Office of Industrial Relations Tower crane code of Practice 2017 by Minister for Employment & Industrial Relations Queensland- Australia. On referring to **clause 5.4 (attached as annexure 3)** of the said code which deals with minimizing the risk of injury from falling objects, the committee felt that relevant provisions should be incorporated in final recommendations. Furthermore, any other clause mentioned in the above code shall be duly considered by the committee for final recommendation.
- 9) On similar lines the committee felt that other standard codes would be referred before drafting final recommendations & guidelines.
- 10) After deliberations a schematic protection system where crane boom extends beyond the plot was conceptualized and sketch is attached (**as Annexure -4**) to this MOM.
- 11) The committee members has mutually agreed for the next date of meeting (+ zoom call) on 14<sup>th</sup> April 2023 at 5 p.m. same venue.

The meeting ended with thanks to all the Committee Members.

**Encls:** 1) *Annexure 1 -Appointment of Supervising Engineer from ‘Code of Practice for Safe use of Tower Cranes’*

2) *Annexure 2 -Competent Person for erection, dismantling or height alteration of tower crane from ‘Code of Practice for Safe use of Tower Cranes’*

3) *Annexure 3 -Minimizing risk of injury from falling objects from Tower Crane Code of Practice 2017(PN12040)*

4) *Annexure 4 – Conceptualized Sketch of schematic protection system*

## **MINUTES OF MEETING**

**DATED:** 14<sup>th</sup> April 2023

**TIMING:** 05:00 P.M. (Zoom call)

**VENUE:** via Zoom Call

**PRESENT:**

1. Mr. Roshan Bhoir
2. Dr. Shashank Mehendale
3. Mr. Amol Shetgiri
4. Mr. P.G. Redekar
5. Mr. Vikraman Pillai
6. Mr. Mridul Sharma

**Apologies:**

7. Mr. Girish Dravid

Points discussed;

1. Present committee members agreed to Dr. Shashank Mehendale's suggestion to start sharing the recommendations for next 15 days with examples of case studies of high rises with 'Zero' incidents.
2. The committee members mutually agreed for having next meeting after 15 days.

## MINUTES OF MEETING

**DATED:** 22<sup>nd</sup> May 2023

**TIMING:** 05:00 P.M.

**VENUE:** Four Seasons Resi Club

**PRESENT:**

1. Mr. Roshan Bhoir
2. Dr. Shashank Mehendale
3. Mr. Amol Shetgiri
4. Mr. P.G. Redekar
5. Mr. Mridul Sharma

**Apologies:**

6. Mr. Girish Dravid
7. Mr. Vikraman Pillai

Points discussed;

12) Layout of the report:

- a. Preface to include literature summary - Adv. Mridul Sharma, Amol Shetgiri
  - i. Draft Preface is circulated by Adv. Mridul Sharma, Mr. Amol Shetgiri to add literature summary to the same.
- b. Observations/Technical findings (during erection, operation, natural disasters like cyclone, earthquake)- Dr. Shashank Mehendale, Mr. P. G. Redekar & Mr. Roshan Bhoir
  - i. The draft will be circulated in due course of time
- c. Case study on Zero incidence sites – Mr. Vikraman Pillai & Mr. Girish Dravid
  - i. The draft has been circulated by Mr. Vikrman Pillai on the group.
- d. Suggestions & recommendations (Regulatory + Technical part)

13) Further line of action-

- a. Draft of the report to be circulated on the group for perusal within a week
- b. The Crane manufacturers /Operators would be called for discussions & presentations in order to come out with additional innovative points to be captured in the report-

Mr. Vikraman Pillai & Mr. Girish Dravid to guide on whom to contact. A questionnaire for manufacturers & Operators to be finalized before actual interview.

14) The committee members mutually agreed for having next meeting after 7 days.

## MINUTES OF MEETING

**DATED:** 29<sup>th</sup> May 2023

**TIMING:** 04:00 P.M.

**VENUE:** Four Seasons Resi Club

**PRESENT:**

1. Mr. Roshan Bhoir
2. Dr. Shashank Mehendale
3. Mr. Amol Shetgiri
4. Mr. P.G. Redekar
5. Mr. Mridul Sharma
6. Mr. Vikraman Pillai

Apologies :

7. Mr. Girish David

Points Discussed :

1. A rough outline index of the report was brought on the table.
2. Layout of the report was further discussed and it was decided to include the checklists of Crane Inspection reports at various periods. Mr. Pillai undertook to provide these report formats.
3. It was decided to prepare the sketches of the schemes for arcade, climbing platform and safety nets to be discussed in the next meeting.
4. Members agreed to have the next meeting after incorporating the suggestions in the draft format of the report and after drafting the preliminary sketches of the schemes as mentioned in 2 above.

The meeting concluded with vote of thanks.

## MINUTES OF MEETING

**DATED:** 22<sup>nd</sup> July 2023

**TIMING:** 11:00 A.M.

**VENUE:** Four Seasons Resi Club

**PRESENT:**

1. Mr. Roshan Bhoir
2. Dr. Shashank Mehendale
3. Mr. Amol Shetgiri
4. Mr. P.G. Redekar
5. Mr. Mridul Sharma
6. Mr. Vikraman Pillai

Apologies :

7. Mr. Girish Dravid

Points Discussed:

1. The preliminary schematic sketches were tabled.
2. Members had many suggestions on the sketches.
3. Reference was made to the observations made during site visits and also Mr. Pillai's experience on the project he is working on regarding the safety nets and safety platforms.
4. It was decided to incorporate these suggestions in the sketches for the next meeting.

The meeting concluded with a vote of thanks.

## MINUTES OF MEETING

**DATED:** 23<sup>rd</sup> September 2023

**TIMING:** 9:30 A.M.

**VENUE:** Four Seasons Resi Club

**PRESENT:**

1. Mr. Roshan Bhoir
2. Dr. Shashank Mehendale
3. Mr. Mridul Sharma
4. Mr. Vikraman Pillai

Apologies :

1. Mr. Amol Shetgiri
2. Mr. P.G. Redekar
3. Mr. Girish David

Points Discussed:

1. The revised preliminary schematic sketches were tabled.
2. Additional suggestions were given on the sketches.
3. Roles and responsibilities of the Licensed Safety Officer were read out and deliberated upon. These will be part of the report and recommendations.
4. The width of the lowermost safety net was decided as 6 m to facilitate safe movement of vehicles in the open space. Other upper nets can be of 3 m width.
5. Presentation provided by Mr. Pillai was viewed for safety induction programme conducted on his site. Salient points were noted to be incorporated in the report.

The meeting concluded with a vote of thanks.

## **MINUTES OF MEETING**

**DATED:** 18<sup>th</sup> November 2023

**TIMING:** 4:00 A.M.

**VENUE:** Four Seasons Resi Club

**PRESENT:**

1. Mr. Roshan Bhoir
2. Mr. Amol Shetgiri
3. Mr. P.G. Redekar
4. Dr. Shashank Mehendale (Joined online)
5. Mr. Mridul Sharma
6. Mr. Vikraman Pillai
7. Mr. Girish Dravid (Joined online)

Points Discussed:

1. The sketches were finalized after minor suggestions. These sketches will now be made into pictorial drawings for easy understanding by the users of the report.
2. Additional points in the Australian Code were highlighted. To be incorporated in the report.
3. It was decided to amend the preface by providing news items of the fatal incidents to emphasize the purpose of the report.
4. The High Court Order will be attached to the report as an Annexure.

The meeting concluded with a vote of thanks.

## **MINUTES OF MEETING**

**DATED:** 14<sup>th</sup> January 2024

**TIMING:** 4:00 A.M.

**VENUE:** Four Seasons Resi Club

**PRESENT:**

1. Mr. Roshan Bhoir
2. Mr. Amol Shetgiri
3. Mr. P.G. Redekar
4. Dr. Shashank Mehendale
5. Mr. Mridul Sharma
6. Mr. Vikraman Pillai
7. Mr. Girish Dravid (Joined online)

**Points Discussed:**

1. The checklists at various stages for crane inspection were received.
2. The final sketches were shown to the committee. They were approved.
3. Additional points in the Australian Code were confirmed.
4. Crane operator qualifications were discussed and finalized.
5. It was decided to come up with the draft of the report as per the format and content discussed so far. The date of the tabling such a draft was fixed at mid-February.

The meeting concluded with a vote of thanks.

## **MINUTES OF MEETING**

**DATED:** 2nd March 2024

**TIMING:** 11:00 A.M.

**VENUE:** Four Seasons Resi Club

**PRESENT:**

Mr. Roshan Bhoir  
Mr. Amol Shetgiri  
Mr. P.G. Redekar  
Dr. Shashank Mehendale  
Mr. Mridul Sharma  
Mr. Vikraman Pillai  
Mr. Girish Dravid

**Points Discussed:**

1. The committee expressed satisfaction that all members were physically present.
2. The first draft of the report was produced for the comments of the members. The draft was browsed on screen section by section. Members expressed satisfaction regarding the format of the report.
3. Members expressed that they will need some time to go through the contents of the report and come up with comments if any.
4. The next meeting will be held after members provide their views on the content of the report.

The meeting concluded with the vote of thanks.

## **MINUTES OF MEETING**

**DATED:** 23rd March 2024

**TIMING:** 4:00 P.M.

**VENUE:** Online Meeting

**PRESENT:**

Mr. Roshan Bhoir  
Mr. Amol Shetgiri  
Mr. P.G. Redekar  
Dr. Shashank Mehendale  
Mr. Mridul Sharma  
Mr. Vikraman Pillai  
Mr. Girish Dravid

**Points Discussed:**

1. The members reviewed the report in detail.
2. Members had come up with their comments on the clauses and recommendations in the report with respect to exact wording of the same. Three chapters and the preface were discussed in detail and contents were finalized.
3. It was decided that other chapters will be similarly read together and finalized.
4. The next meeting is scheduled after a week.

The meeting concluded with the vote of thanks.

## **MINUTES OF MEETING**

**DATED:** 10 th May 2024

**TIMING:** 11:00 A.M.

**VENUE:** Online Meeting

**PRESENT:**

Mr. Roshan Bhoir  
Mr. Amol Shetgiri  
Mr. P.G. Redekar  
Dr. Shashank Mehendale  
Mr. Mridul Sharma  
Mr. Vikraman Pillai  
Mr. Girish Dravid

**Points Discussed:**

1. The complete draft of the report was sent by the compiler Mr. Girish Dravid to all the members two days ago.
2. Members were satisfied with the draft. However, there were a few more comments on the wording and phrases of the clauses.
3. Members decided to edit the draft in track change mode and send it back for finalization.

The meeting concluded with the vote of thanks.