

# **METHOD STATEMENT FOR SPAN ERECTION USING LAUNCHING GIRDER**



## CONTENTS

1. PURPOSE
2. REFERENCE DOCUMENTS
3. DEFINITIONS
4. DESIGN LIMITATION & CONSIDERATION
5. LIMITATIONS & FEATURES
6. SITE PLANNING AND PRELIMINARY ACTIVITIES
7. RESPONSIBILITIES
8. EQUIPMENT AND MACHINERIES
9. SEQUENCE OF ACTIVITIES
10. LAUNCHING GIRDER ASSEMBLY
11. SEGMENT TRANSPORTATION
12. LIFTING OF SEGMENTS
13. GLUING OF SEGMENTS
14. TEMPORARY STRESSING
15. SURVEY CHECKING
16. TENDON / STRAND LAYING AND THREADING
17. STAGE-1 POST TENSIONING
18. SPAN LOWERING ON TEMPORARY BEARING
19. STAGE-2 POST TENSIONING
20. CHECK FOR SLIPPAGE
21. LG LAUNCHING AND ERECTION OF NEXT SPAN
22. GROUTING OF DUCT
23. PERMANENT BEARING INSTALLATION

## **01) PURPOSE**

The purpose of this document is to establish the specific methods and procedures that shall be followed for the launching of precast segments for the viaduct portion of the bridge and its related quality, inspection, health, safety, environmental and resources deployment procedures in accordance with the Contract Specification along with the Good for Construction drawings.

## **02) REFERENCE DOCUMENTS**

- 📌 Approved drawings
- 📌 Deal's LG – Assembly Manual
- 📌 Deal's LG - Operational Manual
- 📌 Site Health and Safety Plan
- 📌 Site Environmental Management Plan
- 📌 Inspection Test Plan
- 📌 Traffic Management Plan

## **03) DEFINITIONS**

- 📌 HSE – Health, Safety and Environment
- 📌 PPE – Personnel and Protective equipment
- 📌 GPS – Global Positioning System
- 📌 CRSI – Concrete Reinforcing Steel Institute
- 📌 LG – Launching Girder
- 📌 GFC – Construction drawings

## **04) DESIGN LIMITATION & CONSIDERATION**

Maximum wind speed 15 m/s [54km/hr] has been considered during Auto-Launching & Segment Erection operation. If wind speed goes more than the consideration, operations shall be stopped. If wind speed goes more than 20m/s [72 km/hr] Launching Gantry will be anchored.

During Auto Launching & Segment Erection process, weather forecast shall be maintained at site office. Before each Auto Launching & Segment Erection process a weather forecast shall be obtained for 10 days starting from the day of Auto Launching & Segment Erection operation.

## 05) LIMITATIONS & FEATURES

Following are the Limitations & features of the Launching Girder System:

- 📌 Maximum weight of segment: - xxx MT
- 📌 Maximum weight of span: - xxx MT
- 📌 Maximum Span Length: - xxx m
- 📌 Minimum radius of the viaduct: - xxx m
- 📌 Maximum gradient of viaduct: - xxx %
- 📌 Max super-elevation: - xxx %
- 📌 Capacity of the Gantry Crane: - xxx MT
- 📌 Maximum Eccentricity at Front Support during Auto-Launching: - xxx mm
- 📌 Maximum Eccentricity at Middle Support during Auto-Launching: - xxx mm
- 📌 Maximum Eccentricity at Rear Support during Auto-Launching: - xxx mm
- 📌 Maximum Eccentricity at Front Support during Segment Erection: - xxx mm
- 📌 Maximum Eccentricity at Middle Support during Segment Erection: - xxx mm
- 📌 Maximum Eccentricity at Rear Support during Segment Erection: - xxx mm
- 📌 Extreme Position of Gantry during Auto-Launching: - xxx m from Tail End of Nose

## 06) SITE PLANNING AND PRELIMINARY ACTIVITIES

Prior to any construction activities related to span erection using LG, pre-construction evaluations should be completed to determine existing conditions that could affect span erection activities. Necessary work permits shall be obtained before commencement of concerned activities at site. The following sections details about preconstruction activities.

### Site Preparation

Prior to construction, work sites within proposed boundary shall be prepared to mobilize workers and equipment's such as cranes, trailer for shifting segments, etc. This would include clearing of work area for stacking of materials and barricading of construction site work area for equipment movement, followed by mobilization of equipment and materials.

### Traffic Management

Temporary traffic management, if required shall be carried out as per detailed traffic management plan. Necessary trailer movement during span erection shall be studied and necessary traffic plan shall be carried out to ensure safe transportation of segments from casting yard. Adequate traffic routes shall be clearly defined around the site with the correct signage and lighting.

- 📌 Maximum speed on road shall not exceed 50 Kph.
- 📌 A speed limit of 10 Kph shall be imposed on the site.
- 📌 Vehicles shall be cleaned where necessary prior to leaving site to ensure no excess material is transferred onto the highway.
- 📌 Flagmen will be deployed where required and when vehicles are reversing.
- 📌 Any vehicles not fit for purpose shall be removed from site.
- 📌 All drivers shall have the correct license for the vehicle they are driving.
- 📌 All drivers shall adhere to the PPE requirements for the site.



### **Temporary barricading**

Temporary barricading of location shall be done to ensure safe work environment. Openings shall be provided at required areas, wherever there is a planned movement of vehicle or crane.

### **Site Infrastructure**

Temporary offices (Portacabin) for staffs shall be provided where drawings and official records shall be maintained. Workers shall be provided with separate portacabin / restrooms.

Storage portacabin shall be provided for storage of materials, safety equipment's (PPE) and First aid facility. Toilets for staff and workers shall be provided separately along with sewage collection tank. Water storage tank (drinking and other use) shall be provided. Generator shed shall be provided along with space for electrical equipment's storage wherever required.

### **FIRST AID AND EMERGENCY SERVICES**

First aid box shall be provided at all stations. The first aid box will be supervised by on site first aider/supervisors.

First aid shall be readily available during the all the hours where work is carried out on site. All training shall be to Indian red cross society approved standards and such training shall include Cardio Pulmonary Resuscitation (CPR) and other emergency techniques. All first aiders shall be suitably identified with a "Red-Crescent" sticker pasted on the left side of the safety helmet. It shall be worn at all times when on the site.

In addition, emergency ambulances can be called for any unwanted major accident/incident.

### **EXTERNAL EMERGENCY CONTACT LIST**

- 📞 Display Emergency contact list
- 📞 Summoning the emergency service.
- 📞 In the unfortunate events of an emergency happening.
- 📞 The first criterion is to assess the situation and contact the relevant emergency services.
- 📞 During the emergency service call, local language speaking person must be available for the effective communication with the emergency service.
- 📞 Once the emergency service has been summoned, place a contact at an appropriate and visible location in order to direct the emergency crew to the specific location of the casualty on arrival

## **07) RESPONSIBILITIES**

**SITE ENGINEERS – 4 Nos**, will be responsible for managing all equipment, plant, machinery and work force for this work. Since, the activity will be carried out during night time also. Two engineers shall be deputed during day and two during night. He shall have complete knowledge of the entire launching activity and abreast with the processes and the limitations of procedure.

**SECTION ENGINEER/ MANAGER – 2 Nos**, will be responsible for the entire activity. All the site engineers for the above job shall report to him on shift basis. He shall formulate plan and program to achieve the entire activity safely and smoothly as per schedule. He shall coordinate with all the other departments at casting yard, survey, planning, design, procurement and subcontracts for proper execution of all the activities.

**QA/QC ENGINEER – 1 Nos**, will be responsible for ensuring the quality of work as per the specification. His day-to-day activity shall include verifying the gluing operation, segment stressing and other quality related activities.

**SAFETY OFFICER – 02 Nos**, will be responsible to ensure the safety of worker and of the entire procedure during the progress of work. This is a very important person in this activity and shall be stationed at all the time. He should be aware of the entire launching activity and abreast with the processes, the limitations of procedure and specially this manual. He should on a shift basis report his written observations list to the Section In-charge and the Safety Manager of the project. If any unsafe activity is observed, he should be in authority to stop the complete works and not allow until the adequate measure has been taken and a written report has been submitted. For start of any activity pertaining to any operation a safety approval must be necessitated by the safety officer in writing.

**PROJECT MANAGER/PLANNING MANAGER/DESIGN OFFICE**, will be responsible for coordinating all the drawings between the design team and execution team. They shall seek and maintain a daily report of all the activities from the execution team and co-ordinate in smooth execution of all the works.

**SURVEY ENGINEERS – 2 nos**, will be responsible for correct execution of erection works true to lines and levels taking into consideration the as built coordinates of the pre-cast segment. He shall be stationed on both the shifts. During Auto-Launching operation, for lateral shifting and during erection and segment matching he shall confirm the position and coordinate to the line supervisor and site engineer to proceed further.

It shall be ensured that supervisory personnel at all level and workmen carrying out each of the erection process are adequately informed and well trained. They shall have the overall understanding of the process and the consequent loss of quality & loss in the service life of the bridge due to inadequate adherence to the procedures.

**HYDRAULIC OPERATOR, 08 Nos**, will be responsible for all the hydraulic Jacks operation. Four shall be stationed during day and four during night. He shall be instructed by the site engineer with regards to the raising/closing operation of any Jack. He shall

maintain a checklist of all the Jacks each in separate sheet location wise. Major Activities shall include operation of Jacks at all support locations, side shifting operations, Auto-Launching and Bracking Operations. Other activities shall include regular maintenance of Jacks and Power Packs, replacement of any Jacks for repair, operations of mono strand Jacks and MacAlloy Bar Jacks. He shall be accompanied by his team of helpers and support staff at P&M workshop.

**SEGMENT GANTRY OPERATOR, 02 Nos.**, will be responsible for the Segment Gantry operation. One will be stationed during day and one during night. He shall be instructed by the site engineer with regards to the movement and locking of the Segment Gantry and shall keep a record of all the operations pertaining to its operation on day to day basis. Major activities shall include moving of Segment Lifting Gantry during Auto-Launching operation and erection of segments during span Erection. Other activities shall include regular maintenance, replacement of any parts for repair. He shall be accompanied by his team of handy-man at ground who shall guide him with respect to position. He shall be in constant touch with the site engineer.

**ELECTRICIAN, 02 NOS**, will be responsible for the electrical operations. One will be stationed during day and one during night. He shall work as and when requested by the site engineer with regards to the attending any operation. Major activities shall include checking and daily monitoring of all electrical equipment at site and maintaining records and attending any faults/repairs. He shall be in constant touch with the site engineer.

Other than the above, Skilled workers shall be positioned on location of Front Support, Middle Support, Rear Support, Lifting Gantry, Lifting Hanger, and Segment Feeding at Ground Level etc. They shall keep a constant vigil during execution of any activity especially during Auto-Launching and Segment Erection Process.

In addition to the above there shall be a team of labour (6-8 persons) headed by a supervisor to execute the segment lifting operation during erection process. Also, a team of labours (4-6 persons) shall be deployed headed by a supervisor for the operation of Gluing, Segment Alignment, Dry/Wet Matching and Temporary Stressing Operation.

Another team of workmen (10-12) headed by a Supervisor shall be provided with the task of permanent stressing after the erection work of span is complete.

During execution if additional manpower is required shall be adequately deployed as and when required. Assistance from skilled workers shall be given for placing installation of strands and stressing.

## **08) EQUIPMENT AND MACHINERIES**

### **SPECIAL MATERIALS**

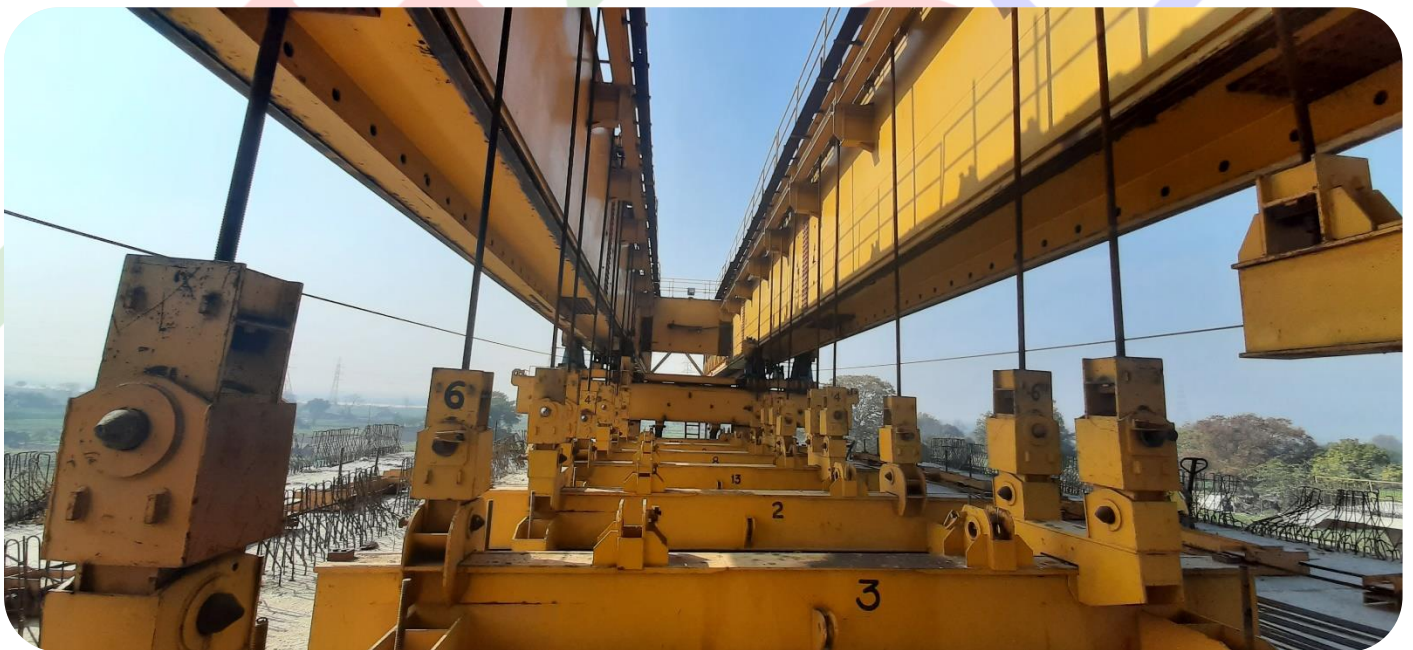
- 🔧 MacAlloy Bars  $\emptyset$  and lengths as mentioned in each drawings.
- 🔧 Nylatron Pads Thickness of 20 mm with friction coefficient <12%
- 🔧 Stainless Steel

### **GENERAL LIST OF EQUIPMENT AND MACHINERIES**

- 🔧 Crawler Crane

- 📌 Hydraulic Jacks and power pack as required
- 📌 Span Jack
- 📌 Segment transportation trailer
- 📌 Stress bars for temporary stressing
- 📌 Temporary Stressing Jacks
- 📌 Permanent Stressing Jacks
- 📌 Hydraulic units for Jacks
- 📌 Manlift for gluing
- 📌 Scaffold tower for access to deck (at every 10 span)
- 📌 Forklift for bearing assembly
- 📌 Total station
- 📌 Leveling instruments
- 📌 Generator

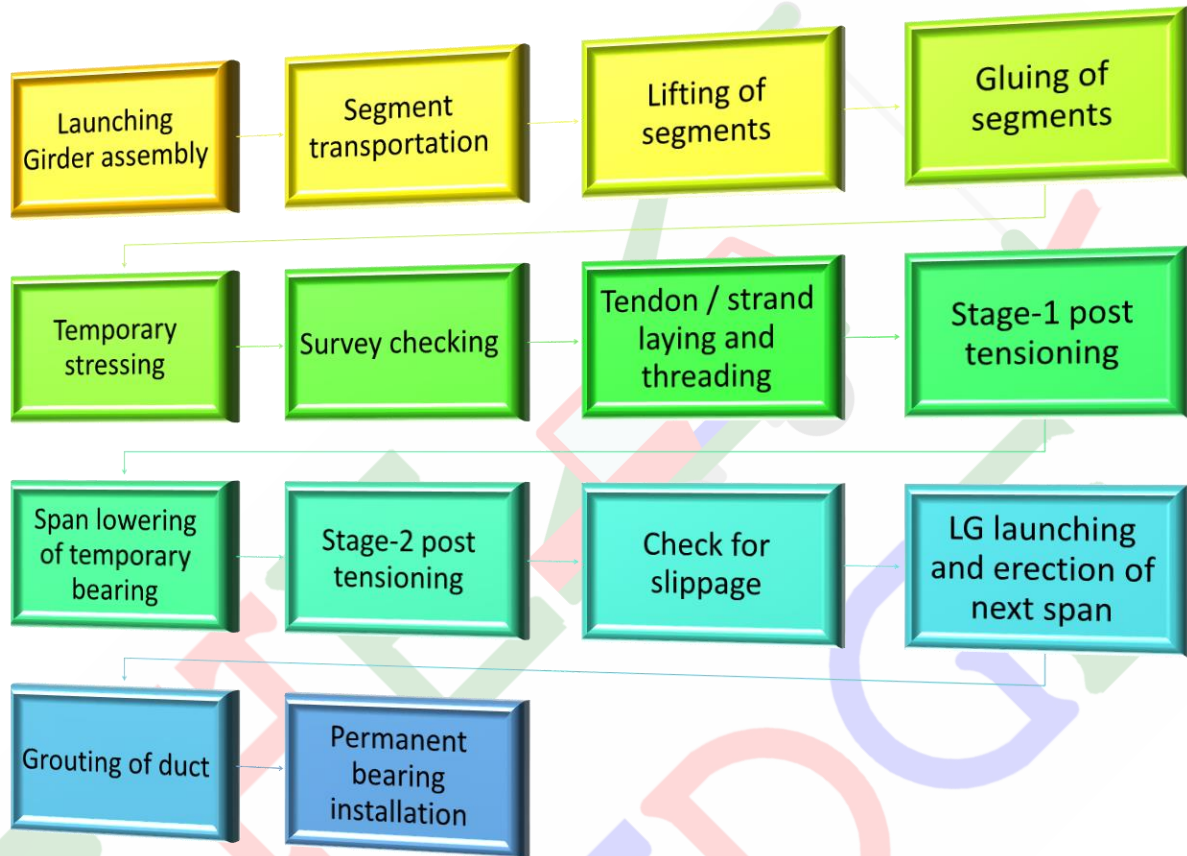
Above list shall be updated based on final project schedule and type of machinery to be used.





## 09) SEQUENCE OF ACTIVITIES

The sequence of activities for span erection are described below,



- 📌 Launching Girder assembly
- 📌 Segment transportation
- 📌 Lifting of segments
- 📌 Gluing of segments
- 📌 Temporary stressing
- 📌 Survey checking
- 📌 Tendon / strand laying and threading
- 📌 Stage-1 post tensioning
- 📌 Span lowering of temporary bearing
- 📌 Stage-2 post tensioning
- 📌 Check for slippage
- 📌 LG launching and erection of next span
- 📌 Grouting of duct
- 📌 Permanent bearing installation

## 10) LAUNCHING GIRDER ASSEMBLY



Refer method statement LAUNCHING GIRDER ASSEMBLY for details. Launching girder shall be Load tested and approved before assembly at erection location. Temporary footing for supporting trestle shall be cast and cured. The supporting trestles shall be brought to site in modules and erected. Refer annexure drawing for supporting trestle module details. The bracings and

anchor connections between supporting trestle and pier shall be done as per drawing before erection of supports.

After complete assembly of supporting trestle, rear support assembled at ground level shall be erected in location using crane and anchored to supporting trestle. Then auxiliary support shall be erected using crane and anchored to supporting trestle. Front support shall be erected using crane and anchored to other (front) pier. Main girders shall be assembled at ground level and erected in location one by one as per annexure drawing. Refer Deal's Assembly manual for detailed procedure and safety measures during erection of supports, main girder, winch gantry, winch gantry, electrical equipment's, and other accessories

## 11) SEGMENT TRANSPORTATION

Segments shall be dispatched from casting yard for erection, only after concrete attaining required design strength of 28 MPa / minimum 14days after after concreting as mentioned in approved drawings. If water soluble de-bonding agent is used, then it shall be completely removed on area's where epoxy glue to be applied during segment erection which shall ensure good epoxy bonding. If resin based debonding agent is used, then the same need not be removed. Curing compound applied on matching face location shall be completely removed by grit blasting before dispatch, for proper bonding on concrete for matching face.



All sheathing duct holes shall be cleared properly by air blowing. All anchor cones shall be exposed & positions shall be checked, before segment dispatching.





Transfer beams for segment erection and temporary stressing shall be fixed to segment before dispatch of segment from casting yard. To avoid local damage to concrete surface due to temporary stressing, rubber sheets or suitable packing material shall be placed between transfer beam and segment. Each transfer beam shall be stressed to segment using 4nos. of vertical stress bars as show in photo.

Segments shall be dispatched according to erection requirements at site. Segments shall be tied properly with trailer as per approved segment transportation plan. The transportation route plan to reach the designated erection site shall be defined, before dispatch of segments from casting yard.

## 12) LIFTING OF SEGMENTS

After segment reaches erection site, trailer shall be parked / positioned below launching girder. Spreader beam shall be installed over segment as per drawing by 4 MacAlloy bars and stress to avoid difference load at the time of lifting. The winch shall be lowered and connected manually with Spreader beam using 2 circular pin. Temporary stressing beam should also install before lifting.



The segment shall be lifted from trailer and it shall exit the location. Then segment shall be rotated as per alignment and then erected upto required erection level. As per span slope, segment shall be rotated with spreader beam jacks and workers shall be engaged to connect transfer beam with hanging bars using 4 circular pins. After connection of 4 circular pins with transfer beam is made, segment shall be lifted using both hanging bars until load on winch spreader beam and remove the 2

circular pins connecting winch spreader beam. Care shall be taken to ensure that loads are equally transferred to both side hanging bars by operating jacks simultaneously.

Similarly, all segments shall be lifted using winch and transferred to hanging bars. Refer drawing for sequence of segment erection.

### 13) GLUING OF SEGMENTS

After erection of all segments of span, Expansion joint (EJ) segment near Rear support (RS) shall be aligned as per global coordinates using survey insert plates provided on segment. Refer drawing for location of survey points on segments. The alignment adjustment of EJ segment shall be done using jacks provided in hanging bar system. The EJ segment shall be positioned such that EJ segment just rests on top of temporary bearing (placed in location of permanent bearing), ensuring that load in hanging bars is maintained.

The match cast face of aligned EJ segment and segment type-2 (positioned 300mm away) shall be verified visually for shear key locations. The segment shall be dry matched using side shifting jacks of hanging bar system / LG's winch, ensuring that segments are in level / position for stressing. Survey check shall be carried out for the coordinates of aligned segments with global coordinates. After checking for accuracy of alignment, segment type-2 shall be separated by 300mm using LG's winch / side shifting jacks of hanging bar system.



Even though segment is checked at casting yard, it shall be ensured that match cast surface is free from form release agent, de-bonding agent, laitance or any other deleterious material that would prevent epoxy bonding agent from bonding to concrete surface. If any it shall be removed by light grinding or wire brushing. Care shall be taken that surface / shear key shape and profile of mating surfaces does not get damaged. It shall be ensured that surfaces have no free moisture on them at the time of epoxy bonding agent application. Compressible and self-adhesive rubber gasket (thickness shall be equal to minimum layer thickness of epoxy glue), shall be fixed around pre-stressing ducts, to avoid ingress of epoxy into duct, and during closing of segments joint after application of epoxy.

Approved epoxy glue shall be used for segment gluing operations. Required quantity of epoxy shall be brought and two components of epoxy shall be mixed in strict accordance



with manufacturer's instructions (use only full and undamaged containers). The epoxy shall be stored in accordance with supplier recommendations. The opened containers shall be immediately mixed and used. It shall be ensured before opening, the date of expiry and shelf life.

Refer <https://youtu.be/jLnVw6trtQs?list=PLAihGxmoPT36hPu3gArJXEli5cmsxQTgC>

Refer <HTTPS://THEBRIDGES.IN/CATEGORYIMAGE/54495081.PDF>

The epoxy shall be mixed with a properly sized mechanical mixer operating in accordance with recommendations of epoxy manufacturer. Epoxy mixing shall be started only after segments are dry matched and ready for gluing. Application of epoxy shall start immediately after a batch has been mixed. The epoxy shall be uniformly applied in accordance with manufacturer's recommendations on faces of segments to be joined. (Trials shall be conducted to agree whether glue to be applied on single face or both the faces)

The epoxy shall not be applied around holes formed by ducts (gasket area). The sufficient amount of epoxy shall be applied, to fill all interstitial space in between the joint. The quantity should be sufficient to create a small bead from the joint, after application of compressive pressure by using stress bars and temporary stressing jacks. If a bead of epoxy is not extruded all around the joint after temporary stressing, then the joint shall be filled by injecting epoxy using injectors in non-extruded portions. The squeezed-out glue shall be cleaned immediately with trowel and that of bottom surface shall be cleaned using a man lifter. Ensure that epoxy is removed cleanly without creating strains on segment.

## **14) TEMPORARY STRESSING**

Immediately after application of epoxy bonding agent on each mating surface, segments shall be brought together. Uniform compressive stress of  $0.28 \text{ N/mm}^2$  shall be maintained at joined surface, by applying stressing force on each bar as specified in GFC Drawing.

Care shall be taken not to reduce the contact pressure until epoxy in the joint has properly hardened. If contact pressure reduces, do not subject the joint to tensile stress. A discernible bead line of extruded epoxy bonding agent must be apparent along the exposed edges of joint. Fill all areas of the joint which do not show a bead of epoxy by dispensing additional epoxy into the joint using a pneumatic gun with epoxy cartridges. Inject epoxy to a minimum depth of 25mm.



All extruded epoxy shall be cleaned from external visible surfaces by using trowel in a way not to damage or stain the concrete surface. Immediately after the segments are joined, extruded epoxy shall be swabbed / cleaned all embedded (internal) post-tensioning ducts or conduits passing through the joints to smooth and wipeout any extruded epoxy. If time between combining the components of epoxy and applying compressive contact pressure exceeds the limitations specified by supplier, then immediately separate the segments and clean the applied epoxy completely.

Similarly, all the segments shall be dry matched, glued and temporary stressing shall be carried out. The following records shall be prepared and submitted to Engineer for information on completion of each span:

- 📌 General
  - 📌 Date and time of jointing,
  - 📌 Segment numbers or spans jointed,
  - 📌 Weather conditions.
  
- 📌 For each joint (identified by location / span number / segment joint numbers)
  - 📌 Manufacturer's supply / lot number of epoxy bonding agent components,
  - 📌 Temperature of the concrete on the joint surface at the middle of each segment when application of the epoxy bonding agent began,
  - 📌 Time of mixing first batch of epoxy bonding agent applied to the joint and completion of application,
  - 📌 Time of applying the required compressive contact pressure.
  
- 📌 Details of any repairs including reason for repair, joint location, volume of epoxy used and method of application, etc.
  
- 📌 Stress force applied in each stress bar
  - 📌 Top bar,
  - 📌 Bottom bar.

## **15) SURVEY CHECKING**

Segment level shall be checked and recorded at identified survey points, and compared with alignment design data. Refer annexure drawing for geometric control inserts on segments. The survey checking shall be carried out, during dry matching to ensure that segments are in location, and after temporary stressing.



## 16) TENDON / STRAND LAYING AND THREADING

The strands shall be stored as per supplier recommendations. The total length of strands shall be calculated based on span length, elongation length due to stressing and working length for jacks, as per supplier recommendations.

Refer stressing document for Multi Strands Post Tensioning Works - Erection Fronts. It covers in detail pre-fabrication, laying and various activities and measures involved in strand laying and threading.



## 17) STAGE-1 POST TENSIONING



After strands are provided as per approved drawings, stage-1 stressing shall be carried out as per approved drawing based on span length. Care shall be taken to ensure that all hanging bars are loaded during stressing activity. If there is any drastic / sudden loss of loads on hanging bars (which shall be monitored on jacks of hanging bars), then stressing activity shall be stopped and the same shall be reported to Engineer in-charge before proceeding with stressing activity.

The stressing shall be carried out in presence of Engineer representative and detailed records shall be recorded on the following,

- 📌 General
  - 📌 Date and time of stressing,
  - 📌 Span number
  - 📌 Weather conditions.
- 📌 For each joint (identified by location / span number)
  - 📌 Manufacturer's supply / lot number of strands and components (including anchor blocks, wedges, etc.)
  - 📌 Time of applying of stressing force as per approved drawing.
- 📌 Stages of load application and corresponding elongation.

## 18) SPAN LOWERING ON TEMPORARY BEARING

Survey check shall be carried out to ensure that horizontal span alignment of span is as per approved alignment data. Both EJ segment coordinates shall be verified to fix horizontal alignment of span before positioning / placing on temporary bearings. If required, span shall be adjusted for horizontal, using launching girder, as per alignment. Variation in horizontal span alignment shall be restricted within the limits specified in approved drawings

The span shall be lowered on temporary bearing in stages,

- Jacks on rear support (refer annexure drawings for jack details) shall be lowered simultaneously by 25mm.
- Jacks on front support (refer annexure drawings for jack details) shall be lowered simultaneously by 25mm.
- Jacks on rear support shall be lowered simultaneously by 25mm.
- Jacks on front support shall be lowered simultaneously by 25mm.

Refer annexure document showing erection analysis for stressing and span lowering sequence. After complete lowering of span on temporary bearing, hanging bars shall be relieved from load but shall be in position until stage-2 post tensioning is completed.

## **19) STAGE-2 POST TENSIONING**

Stage-2 post tensioning shall be carried out in sequence as per approved drawing. The stressing shall be carried out in presence of Engineer representative and detailed records shall be recorded on the following,

- General
  - Date and time of stressing,
  - Span number
  - Weather conditions.
- For each joint (identified by location / span number)
- Manufacturer's supply / lot number of strands and components (including anchor blocks, wedges, etc.)
  - Time of applying of stressing force as per approved drawing.
- Stages of load application and corresponding elongation.

The same shall be verified and approved by representatives and submitted to Engineer for records.





## **20) CHECK FOR SLIPPAGE**

After stage-2 stressing of span, slippage of tendons shall be noted down as soon as jack is removed and after 24Hrs. of stressing. If there is no slippage of tendons, strand cutting shall be taken up immediately. If slippage is observed in strands, then the same shall be recorded and submitted to designer for verification / concurrence before proceeding with further activities. After concurrence from designer, the strand cutting and grouting activities shall be taken up. Refer another document for the detailed procedure for measuring the slippage losses.

## **21) LG LAUNCHING AND ERECTION OF NEXT SPAN**

After lowering of span on temporary bearings, hanging bars shall be detached from segment transfer beams. The launching girder shall be prepared for next span launching, ensure that front support and rear support are anchored till slippage check is satisfactorily completed. Refer annexure drawings for typical launching sequences of spans. After launching to next span, segment erection activities shall be taken up for next span.

## **22) GROUTING OF DUCT**

Grouting activities of tendon ducts shall be carried out only after check for slippage and accepted by Engineer. Approved grouting materials shall be used for duct grouting. Grout shall be prepared as per supplier specifications. Refer another document for detailed grouting procedures.

## **23) Permanent bearing installation**

The permanent bearing installation is elaborated in separate method statement.