



[Visit Suncam.com for more courses](http://www.suncam.com)

Continuing Education Course #149
Precast Segmental Bridge Construction
Part 1 - An Introduction

1. Precast Concrete Segmental Bridges are gaining popularity with owners because they offer benefits like:
 - a. Reduced costs, reduced construction time, reduced environmental impacts, and reduced steel requirements
 - b. Reduced costs, reduced rideability, reduced environmental impacts, and reduced maintenance of traffic
 - c. Reduced costs, reduced construction time, reduced concrete strengths, and reduced maintenance of traffic
 - d. Reduced construction time, reduced costs, reduced environmental impacts, and reduced maintenance of traffic
2. Which factor is not a benefit of a designer's choice for choosing Precast Bridge Structures?
 - a. Adaptability for different modes of transportation
 - b. Easily modified deck geometry for future widening
 - c. Higher durability with less maintenance
 - d. Factory like construction allows better quality control measures
3. When outlining a fundamental manufacturing plan for a precast yard what factors may influence precasting decisions?
 - a. Site Selection and Preparation, Casting Cell Construction, Concrete Placing and Curing, Storage and Finishing, and Concrete Strength Requirements
 - b. Site Selection and Preparation, Union and Non-Union Labor Force, Concrete Placing and Curing, Storage and Finishing, and Loading and Transporting
 - c. Casting Cell Construction, Concrete Placing and Curing, Site Selection and Preparation, Storage and Finishing, and Loading and Transporting
 - d. Casting Cell Construction, Concrete Placing and Curing, Erection Site Geotechnical Data, Storage and Finishing, and Loading and Transporting
4. When selecting a precasting site a factor that would influence the decision would be:
 - a. Adequate storage area
 - b. Distance to bridge erection site
 - c. Proximity to a skilled workforce
 - d. All of the above
5. When designing casting cells what major factors should the engineer consider?
 - a. Tensile strength for post-tensioning strands
 - b. Types of axle loading anticipated on the deck riding surface
 - c. Geotechnical and environmental restrictions at the bridge site
 - d. None of the above
6. A rebar jig is:
 - a. A tool used to quickly connect individual pieces of rebar together with tie-wire
 - b. A tool used to bend and shear rebar to the designed configuration

- c. A tool used at the casting cell for pre-tying the rebar cage
 - d. A tool used to unload rebar delivered from the fabricator
7. At the placement location, what concrete test must be performed on the wet concrete?
- a. Large aggregate gradation tests
 - b. Alkali-silica reactivity tests
 - c. Cylinder compression strength tests
 - d. Percent entrained air content tests
8. What can a designer specify that will help precasters with the deck finishing of the segment?
- a. A self-consolidating concrete mix which will flow better for rideability
 - b. A post-erection deck treatment to help rideability
 - c. A GPS robotic deck screed automated to grade for rideability
 - d. Since segments are match-cast rideability is not a concern
9. When placing a cast segment in storage, it should be placed on:
- a. Stabilized grade using dunnage placed in a three point pattern to ensure the segment won't rack and lose shape
 - b. Stabilized grade using Hillman Rollers placed in a three point pattern to ensure the segment won't rack and lose shape
 - c. Stabilized grade using Hillman Rollers placed in a three point pattern to allow easy movement through the storage facility
 - d. Stabilized grade using hydraulic jacks placed at the segment corners to ensure the segment stays plumb and level
10. How are precast column segments permanently joined to cast in place footings?
- a. Bearing plates are cast in the footing top and are welded to sole plates in segments
 - b. Ductwork and anchors must be cast in the footing for the post-tensioning system
 - c. High strength epoxy is rubbed on the exposed faces as a sealant and bonding agent
 - d. The precast structures are so massive their weight is sufficient to maintain stability
11. Prior to permanent post tensioning, precast segments are erected with an epoxy placed on the match-cast faces because:
- a. The epoxy acts as a lubricant and sealer to facilitate a tight fit between segments.
 - b. The epoxy glues the segments together so they act as a single unit.
 - c. The epoxy is required by state DOT's
 - d. The epoxy provides an architectural finish to hide imperfections in the match-cast process
12. Why are elongations measured on the post tensioning strands after stressing?
- a. Because if the steel stretches it is considered a failure and must be replaced
 - b. It is measured to make sure the wedges don't slip and they retain the loaded energy
 - c. It is a way to make sure the correct size and number of strand were placed in the anchorage
 - d. It is a way to ensure the stresses occurred over the entire length of the strand because a shortened elongation will mean the strand is pinched somewhere along its length.
13. The span-by-span method of superstructure erection is economical for spans ranging:
- a. Up to 100 feet
 - b. Spans from 80 to 180 feet
 - c. Spans from 150 to 500 feet
 - d. Spans over 400 feet
14. If excessive span heights or local crane height restrictions prevent the use of ground based or barged cranes to lift segments to the temporary supports of a span-by-span erection, what might be an option?

- a. Cranes are always used for this procedure
 - b. Specialized gantry transports can be utilized
 - c. Segmental bridges are not designed for limited access sites
 - d. None of the above
15. In the context of the span-by-span section, a closure pour is:
- a. A concrete placement between the piers and mid segments to correct for field conditions
 - b. A concrete placement to close temporary access points in the superstructure
 - c. An epoxy poured on the match-cast faces to seal the joints “closed”
 - d. A concrete pour at the end of the pre-stressing tendons to close the ducts
16. Balanced Cantilever method of construction:
- a. Is a method where segments are individually erected and are self-supporting.
 - b. Is a method where segments are erected incrementally both up-station and down-station in a balanced state.
 - c. Is a method where segments are erected in their permanent location starting at a central point and working cantilevered outward.
 - d. All of the above
17. The Balanced Cantilever method of superstructure erection is economical for spans ranging:
- a. Up to 100 feet
 - b. Spans from 80 to 180 feet
 - c. Spans from 150 to 500 feet
 - d. Spans over 400 feet
18. After setting a balanced cantilever segment the as-erected survey check yields minor deviations in line and grade, these deviations can be corrected by:
- a. Resetting the segment with shims
 - b. Forming and pouring a corrective closure pour
 - c. Removing the segment and checking the match-cast faces for irregularities
 - d. Shimming the next segment
19. When completing a balanced cantilever span, steel strongbacks are used to:
- a. Hang formwork and access scaffolding for closure pours
 - b. Stabilize cantilever tips for placing closure pours
 - c. Vertically align cantilever tips
 - d. All of the above
20. The inventor of prestressed concrete and contributor to post-tensioning is:
- a. Eugene Baluarte
 - b. Eugene Freyssinet
 - c. Eugene Hoover
 - d. Eugene Sutong

[Purchase this course on Suncam.com](http://Suncam.com)