

Section 37 - Prefabricated Bridge Elements and Systems (PBES)

37.1 General Criteria

PBES offer significant advantages over onsite cast-in-place construction. Among these advantages are a substantial reduction in onsite time that is required to construct or rehabilitate a bridge, lowest costs resulting from offsite manufacturing, use of standardized components and improved safety due to reduced exposure time in the work zone. The controlled environment of offsite fabrication also ensures quality components for long-term service life performance.

Careful planning, design, and implementation are required to realize the significant advantages of PBES construction. Decision makers must consider if a project should be fast tracked, the applicability of a design, the abilities of contractors and suppliers in the local area, access to a project site and how construction requirements affect cost and schedule.

37.2 Decision Making Guidance

Issues that must be addressed in deciding on the use of PBES include the following:

1. The lack of knowledge and experience in PBES design and detailing, including connections between components and durability of the connection details.
2. The ability of the PBES to accommodate curvilinear geometry.
3. Availability of prefabricators who are capable of producing components.
4. Limitations on component size and availability of equipment to erect the components.
5. Knowledge/experience of local bridge contractors and techniques that are needed to construct bridges of PBES components.

37.3 Considerations For Selection of a PBES

1. Rapid Onsite Construction Warrants
 - a. Does the bridge have high average daily traffic (ADT) and/or high average daily truck traffic (ADTT), or is it over an existing high-traffic-volume highway? Safety concerns and costs may be reduced with the use of a PBES.
 - b. Is the project an emergency bridge replacement? Emergency bridge replacements particularly benefit from the use of prefabricated systems. The existing bridge cannot be used and must be replaced in the least time possible in order to minimize traffic disruption.
 - c. Is the bridge an evacuation route, or over a railroad or navigable waterway? Prefabricated bridges have a particular advantage over conventional bridges for these cases because they greatly expedite on-site installation.
 - d. Will the bridge construction impact traffic in terms of requiring lane closures or detours?
 - e. Will the bridge construction impact the critical path of the total project?
 - f. Can the bridge be closed during off-peak traffic periods such as nights and weekends?

- g. Is rapid recovery from natural/manmade hazards needed or is rapid completion of a bridge repair/replacement needed?
- h. Is the bridge location subject to construction time restrictions due to adverse economic impact?
- i. Does local weather limit the time of year when cast-in-place construction is practical?

2. Other Factors That May Warrant Use of PBES

- a. Safety Concerns. Do worker safety concerns; such as, working adjacent to electrical power lines or over water, limit conventional methods?
- b. Environmental Issues. Is the site in an environmentally sensitive area requiring minimum disruption?
- c. Material Availability. Availability of materials and local suppliers should be investigated.
- d. Site Issues. Restrictions due to site conditions, contractor knowledge, or fabricator availability are issues that should be addressed.

37.4 FHWA Website

For a more complete presentation of decision making guidance on the use of PBES, refer to the following FHWA website link:

www.fhwa.dot.gov/bridge/prefab/framework.cfm