

owners. Some states had to go through a learning curve the first few nights. Lots of lessons were learned during the first few nights. Testimony from contractors needs to be part of the marketing.

- Comment – As training and peer-to-peer exchanges take place, all of the development work should not be redone by agencies as this could affect costs. There has been a lot that has already been learned and it is not necessary to reinvent the known information. For example, PCI documents already have a lot of best practices information.
- Comment – Model specification development for agencies is not just as easy as changing passive voice vs. active voice vs. formatting vs. language. Model specifications cannot be stand-alone but need to be properly integrated with agency specifications. Adopting model specification is not just about changing titles, numbering system, etc.
- Comment – As an example, if we wanted to hold a contractor to a specification for smoothness, it needs to match the agency's current smoothness specifications. Also, there are different standards for slab replacement vs. lane replacement with respect to smoothness requirements. Not requiring grinding of precast panels could make PCP more cost-competitive. It is considered not a good practice to give a contractor smoothness-related incentives for a bad job that is corrected by grinding, especially for continuous applications.
- Comment – If grinding is not included as separate bid item, will contractor bid it into their bid price?
- Comment – Competition will take care of it. Good contractors should know how to do their job.
- Comment – Precast slabs are made to specific tolerances. If each slab is specified to +/- 0.25 inch tolerance, then it is not hard to see that there will be unevenness that needs to be ground.
- Comment – If everything is performance based, the DOT does not care how the contractor achieves the end result. Some states will be going with performance based specifications soon, whether it is precast, cast-in-place concrete pavement, or hot mix asphalt.
- Comment – Unfair to hold PCP end product to a higher standard.
- Comment – We are dealing with individually cast slabs that have a tolerance built into the specifications.
- Comment – For example, "Tolerance Manual for Precast and Prefab ..." Section 9 of Caltrans Manual for Precast Pavements. Panel thickness tolerance is 1/16 inch. Section 40: Tolerance for cast-in-place is 1.8/16 inch (1/100 of a foot) before a contractor gets a deduction. If we are holding cast-in-place to a certain tolerance, we should hold precast to the same tolerances.
- Comment – That is a pay item issue. Comparing thickness of cast-in-place based on structural capacity to smoothness issues for precast is not an equivalent comparison. Also, it is probably more cost effective to highway agencies to grind and achieve the end result for the public anyway.
- Comment – Another factor is speed of production. We are using PCP primarily for speed of production and less disruption to traffic. There is a cost to achieve the speed of construction. You can open it up to traffic following construction and grind the next day to meet the smoothness specification.

- Comment – This is where innovations (such as the leveling bolt system) come in to get the surface elevation even and reduce roughness due to differences in elevation at joints.
- Comment – On a number of intermittent projects in the northwestern US, the projects were ground and the bid prices have been less than \$200/sq. yd.
- Comment – There is something to be said about not over specifying. That can kill innovation and also increase costs.
- Comment – Let the agency decide whether specifications should be prescriptive or end result. Keep in mind what the deliverable from this ETG needs to be.
- Comment – We have model specifications ready for delivery from the R05 work. Are there some changes that need to be made to these model specs?
- Comment – There is nothing missing in the model specifications. The model specifications provide a starting point but states still need to adjust it to meet their needs/requirements.
- Comment – Specifications need to incorporate language/references to the industry guidelines.
- Comment – We are going to go and promote intermittent repair precast panels with 15-20 year lives, but that bothers me a little bit. There is a big project in New York where the intent is to keep adding precast panels in the future so longer life for the older panels is important.
- Comment – We are looking at salvaging and stockpiling the precast panels so that the panels need to have useful longer life. In future, we plan to replace the pavement but salvage the precast panels.
- Comment – There should be a process that allows a state agency to work with various patented systems. Often times, we cannot put all details in specs/plans because a system is patented. In addition, general contractors complain when we keep the plans too generic without sufficient details. Such projects are hard to bid because contractors do not know what is involved in the actual construction due to the patents.
- Comment – The most important part from an agency perspective is to know what is patented so we can deal with it the right way and protect the intellectual property. Fear of lawsuits and violation of intellectual property may potentially affect the effective implementation of PCP technology.

TASK FORCE ON PLANNING AND DESIGN

A discussion on issues related to planning and design for PCP systems was moderated by Shree Rao. The topics for discussion included the following:

- Project selection/candidate projects.
- Demo States – What is limiting the production use of PCP?
- Structural design considerations/gaps.
 - Mechanistic-Empirical Pavement Design Guide (MEPDG) module development.
- Performance expectations.
 - We need to be careful not to over-sell PCP technology.
 - We are hoping for a permanent increasing market share for PCP, jointed systems as well as PPCP.

Items discussed included the following:

- Comment – User cost is the key component missing in trying to evaluate whether a project is suitable for PCP. However, since user delay costs do not come directly out of state budget, many states do not give it full consideration in evaluation of costs.
- Comment – Need to develop case studies on user costs and considerations of user costs in life cycle cost analysis for PCP projects.
- Comment – Should value engineering be allowed to turn a PCP project to a rapid setting cast-in-place project?
- Comments – Discussion on inclusion of PCP design into the new AASHTO Pavement ME Design procedure and software. There was discussion about presenting this need to the AASHTO Joint Task Force on Pavement Design.
- Comment – Need to develop a white paper on maintenance of traffic cost impacts for users.
- Comment – Consider lane rental costs.
- Comment – Consider PCP use for intersections. Allows use of same grade and minimal base/subgrade disturbance. Currently, there is a need for re-doing a lot of key intersections using cast-in-place concrete.
- Comment – Price perception affects consideration of PCP repair/rehabilitation projects. Many agencies are not aware that PCP costs have dropped significantly over the last few years.
- Comment – Need to develop information on unit costs of typical PCP projects and show how costs have decreased over a period of 10 years or so, using the experience at Caltrans, Illinois Tollway, New Jersey DOT, and New York State DOT.
- Comment – Project engineers are not familiar with benefits of PCP. So, effort must be made to educate the project engineers at various DOTs.
- Comment – PCP is good for intersections. Can build in blockouts manholes. etc.

TASK FORCE ON FABRICATION AND INSTALLATION

A discussion on issues related to fabrication and installation of precast panels was moderated by Maher Tadros. The topics for discussion included the following:

- Proprietary and generic systems & components.
- Fabrication considerations.
- Installation considerations.
- Process control and acceptance testing considerations.

Items discussed included the following:

- Comment – One of the issues with proprietary vs. generics is how to specify? Should systems be pre-accepted?
- Comment – Specifications can be open and allow for systems equivalent to a generic system.

- Comment – Specifications can be in line with the AASHTO Technology Implementation Group proposed specifications. Evaluation process and acceptance for PCP systems is included in the R05 report.
- Comment – It is planned to try to have the R05 model specifications to be accepted as provisional AASHTO specifications.
- Comment – Can you define a public interest finding for use of proprietary products?
- Comment – For Federal Aid projects, as long as there is a competing product and a single product available to all bidders, it is not much of an issue.
- Comment – Hard to get the proper performance measures early. For example, Falling Weight Deflectometer (FWD) deflection testing does not really indicate how the system is going to perform in the long term. FWD testing is good to assess initial condition of load transfer at joints, but does not indicate if the base is going to deteriorate quickly.
- Comment – How do we start using new systems and components? Agencies typically say show me where this has been used before. So, it is a Catch-22 type situation. At some point agencies need to take the risk and implement new technologies.
- Comment – Problems with putting panels together due to dimensional tolerance issues. Also, pavement wander issues result in longitudinal joint width increasing over distance.
- Comment – If we over specify precast panels, this may create more problems than it may solve.
- Comments – Discussion on match casting and how it is achieved. General agreement that match-casting typically is not relevant for PCP applications. The technology is there but it has its own issues (time, space, etc.) for fabrication and would be very expensive. It may not make economical or practical sense for routine PCP applications.
- Comment – Issues with spalls along panel edges and at corners. Contractor education is important. Starting to see installation consultants. Low-bid scenario means non-knowledgeable contractors can win PCP projects.
- Comment – Looking into contractor certification. Precasters do a relatively good job in terms of fabricating the panels, but installers who may be general contractors, may not have proper experience to do a good job. .
- Comment – Not only contractors need to be trained, but inspectors need to be trained. Some success training contractors. Some states requesting that state inspectors to be certified as well.
- Comment – Sometimes inspectors are not from the DOT, but work for consultants. They need to be trained as well.
- Comments – PCI and NPCA have certification programs for precasters. Most agencies have requirement for certification from one of these outside agencies. Some states manage their own certification programs.

TASK FORCE ON SYSTEM ACCEPTANCE AND NEW DEVELOPMENTS

A discussion on issues related to fabrication and installation of precast panels was moderated by Joe Kline. The topics for discussion included the following:

- Generic and proprietary systems/components.
- New system/component evaluation and acceptance.

- Prepare updates on new developments and circulate to user groups – agency and industry.
 - To be prepared twice a year.
- Open houses.
 - As authorized, support PCP open house activities, in coordination with highway agencies/FHWA/industry.
 - Plan logistics – date, place.
 - Invite presenters.
 - Promote events.
 - Organize project specific workshop & site activities.

ADJOURNMENT

In closing, Sam indicated that the discussions that took place over the last two days will be utilized to make refinements in the PCP Implementation Marketing Plan. The revised marketing plan will be posted on FHWA's website as soon as possible.

The ETG meeting was adjourned at noon, March 6, 2014.