

## The ROI of R&D

PCI has a long-standing commitment of research and development (R&D) to support the precast/prestressed concrete industry. In fact, PCI may be almost unique in the concrete industry in that the commitment to research and development is codified in the PCI bylaws. According to those bylaws, 8% of producer member dues each year are to be set aside in a segregated fund. Although budget constraints may have caused the PCI Board of Directors to sometimes deviate slightly from that percentage, the core commitment has been there through good times and bad.

And the return on investment (ROI) has paid off for the industry. The research projects that have resulted in new provisions in the *PCI Design Handbook: Precast and Prestressed Concrete* are too numerous to list here, but they include the American Society of Civil Engineers' Opal Award-winning work on seismic diaphragm design and current guidance on dapped-end double tees in the latest edition of the *PCI Design Handbook*. Also included in this list is a research project a number of years ago on torsion reinforcement in spandrels. This research resulted in the elimination of the requirement of closed stirrups for torsion reinforcement. One PCI producer told me that that change amounts to \$100,000 a year in savings for their company. That's ROI!

PCI's return on R&D extends engineering into growing the market and leveraging other money to advance precast concrete. We are currently in the fourth year of a project with the Oak Ridge National Laboratory (ORNL) that looks at the next generation of wall panels aimed at dramatically increased energy efficiency. This five-year, multi-million-dollar project leverages only \$90,000 of PCI R&D investment. An unforeseen result of this project was that ORNL has one of the only large three-dimensional (3-D) printers in the country. Discussions with PCI member Gate Precast led from concept to full-blown project in a year and a half, resulting in 3-D printing used to make complex forms for the Domino Sugar project in Brooklyn, N.Y. At the recent AIA convention, PCI sponsored two sold-out education seminars on enclosure systems and the 3-D printing of forms featuring the work and results of the R&D effort at ORNL. The 3-D printing of forms for complex architectural precast concrete is emerging as a hot topic in the architectural community. Draw a straight line through that and you realize something: no R&D commitment, no ORNL project, no 3-D form printing, no added excitement in the architecture community about precast concrete.

PCI's commitment to R&D also pays dividends for the future of education. Our R&D funds research projects and fellowships that sponsor the next generation of graduate students who, in turn, will be the next generation of professors. The fact is that graduate students will conduct research on topics where funds are available. If research funds are available for precast concrete projects, they will become experts and advocates for precast concrete, going on to inspire the next generation after that—the ultimate ROI. ■

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