



Challenge

The Metropolitan Transit Authority New York City Transit agency (NYCT) had an expensive problem. Meeting fire code requirements for emergency ventilation of the subway system required closure of openings between tracks. Conventional material solutions such as pre-cast concrete or metallic panels were found to degrade critical radio communications within the tunnels. Replacement of the communication system was estimated to cost close to \$1 billion. NYCT looked to Advantic for an alternative material solution with mechanical performance equivalent to conventional concrete but without the detrimental signal loss.

Solution

Advantic succeeded in meeting the mechanical and combustion requirements utilizing a proprietary cast polymer system developed over a decade of research. Advantic's cast polymer materials provide the compressive strength of conventional concrete at a weight savings of over 75 percent, while being radio frequency permeable, impermeable to water, and non-corrosive *as shown in Table 1*

"The implementation of your technology as a light weight, RF 'transparent' alternative to the heavy, precast concrete panels is providing significant benefits here in the New York City Subway Tunnels"

Thomas D. Lamb, Chief Innovation and Technology, New York City Transit

	Conventional Precast Concrete	Advantic+35	Improvement
Density (lb/ft ³)	150	35	76%
Compressive Strength (lb/in ²)	4,000	4,000	--
Panel Weight (lb)	853	66	92%
Installed System Weight (lb)	1209	67	94%

Table 1 | Comparative Properties of a Typical 7' x 3' Panel

Development

A product is only as good as its installed functionality. Further value was provided to the customer by leveraging in-house structural engineering expertise to evaluate not only the material solution but also the method of installation. A critical review of the work methods identified significant cost drivers in labor of installation of support steel frameworks for the panels. In response, the Advantic team developed a patent-pending connection detail, which enabled the elimination of all supporting steel framework *as shown in Figures 1 and 2*. This pivotal improvement resulted in considerable cost savings to the project.

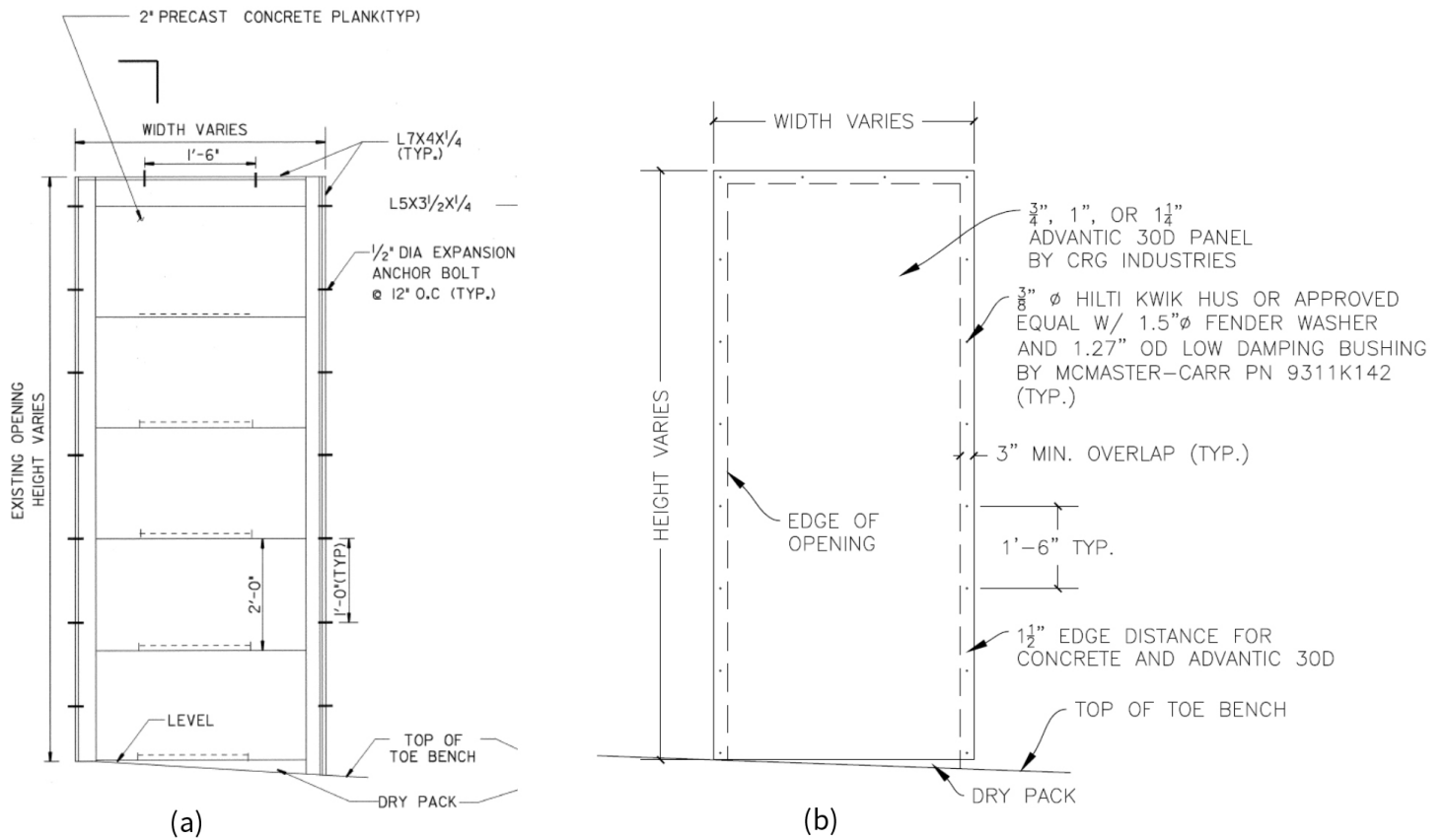


Figure 1 | (a) Original Precast Concrete Installation Detail, (b) Advantic Installation Detail

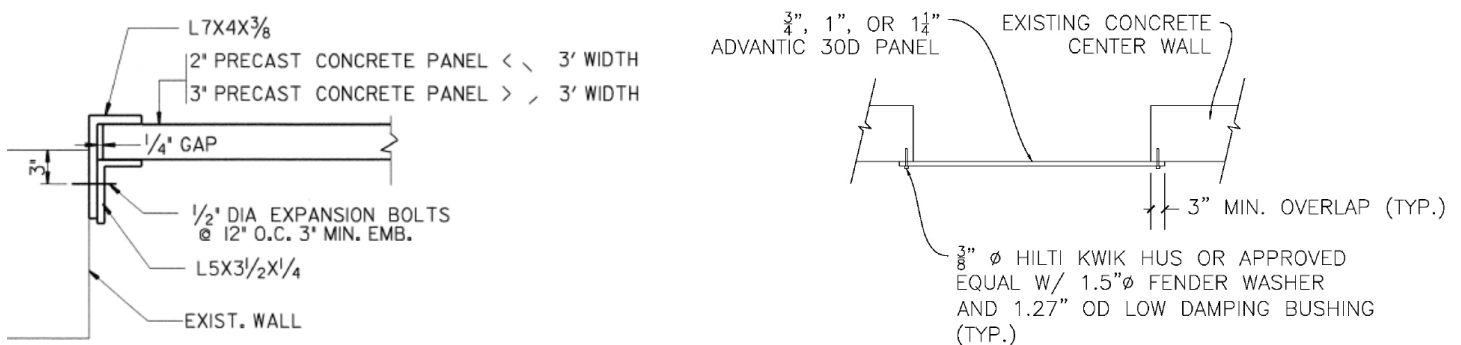


Figure 2 | (a) Original Precast Concrete Support Detail, (b) Revised Support Detail

The Installation

Over 400 Advantic panels were delivered in March 2014. In the first weekend the installation contractor installed 225 panels over approximately 2,000 feet of track. According to the contractor’s supervisor, the normal production rate of a similar crew was approximately 20 precast panels per weekend as observed on previous projects. Advantic provided an increase in construction efficiency of over 1000 percent (greater than 10 times).



Figure 3 | Advantic+35 Panel Installation

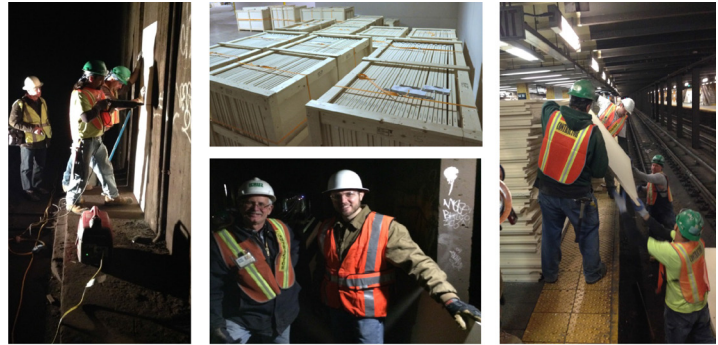


Figure 4 | Advantic+35 Panel Shipment and Installation

Value

To NYCT:

- Valued the total solution against the capital cost of antenna replacement – nearly \$1 billion.
- Negligible maintenance costs: non-corrosive and non-absorptive.
- Significant reduction in construction costs.

To installation contractor:

- Realized time savings of more than 90% compared to a conventional installation.
- Specialized labor trades reduced or eliminated.
- Reduced manual handling risks and improved safety.
- Reduced equipment requirements for transport, lifting, and rigging.

Why Use Advanced Materials?

During a recent meeting at New York City Transit, thought leaders in the agency stated that they could make a solid case for the value proposition for widespread use of Advantic materials using nothing but the reduction in construction costs. The benefits in performance and life cycle cost only further added to their immense value.