

Tunnel Roof Casting Machines

The NOVA Award was presented to the Bird Island Flats Tunnel Roof Casting Machines for innovation in transportable concrete formwork.



The Bird Island Flats Tunnel Project involved the construction of more than a mile of reinforced concrete cut-and-cover tunnel adjacent to Boston's Logan International Airport. The \$290 million tunnel project is one segment of the Boston Central Artery Project.

Designed primarily for poured-in-place construction, the tunnels' dimensions vary greatly. Concrete ceiling heights vary, and width ranges from 40 feet to more than 90 feet. Ceiling thickness was up to 9 feet. Further complicating the fabrication of reusable forms were 45° fillets at the wall-ceiling joint and a tunnel floor that sloped both transversely and longitudinally.

To accommodate these dimensional challenges, Modern/Obayashi turned to Conesco Industries to develop a series of traveling, configurable form machines. Three sizes of machines were developed. Each includes a self-powered traveler module to move the formwork and a hydraulically adjusted form module with an integral shoring system that adjusts for transport or to support the poured-in-place loads.

In use, a traveler moves under a form module, supports it as the shoring is "retracted", and hydraulically strips it from the previously cast concrete. The traveler carries forms and shoring to the next location and hydraulically positions them in all coordinates. The shoring is lowered and the traveler is withdrawn, creating a passageway for workers and equipment.

These machines significantly increased worker safety and reduced casting turnaround from two weeks to just one-saving 36 weeks, 135,000 manhours, and \$4.8 million on the project.

Flexibility to accommodate a constantly changing tunnel profile, and a self-mobilizing design that required minimal set up and takedown were the key to cutting more than 8 months from the original schedule.

Primary Responsible: James Bruno;
James H.J. Hughes, III, P.E.;
John McNamara;
Frank Meggison;
Dinesh Patel;
Takeshi Yamada
Contact: James H.J. Hughes, III, P.E.
Organization: Conesco Industries, Ltd.
214 Gates Road
Little Ferry, NJ 07643
Phone No: 800-631-1978

