The Great Bras D’or (Seal Island) Bridge
Located in Cape Breton, Nova Scotia on the Trans Canada Highway 105, the main crossing over the Great Bras D’or to Industrial Cape Breton. This vital stretch of highway also leads to the only ferry connection to Newfoundland from North Sydney.

In the late 1990s the bridge deck had deteriorated to a point where the cast-in-place slab, which was replaced 10 years prior, was approximately 75% delaminated. A major deck replacement program was required.

The engineering firm of CBCL was hired to do a comprehensive study of the bridge and come up with a method of replacing the existing deck without severely affecting the traffic flow. After reviewing a number of options, Precast Prestressed concrete deck slabs were chosen as the best replacement system for many reasons.

1.) The high performance Precast concrete deck slab system is much more durable than conventional systems.
2.) Prestressed Post-tensioned deck slabs offer superior crack control under service load conditions.
3.) The system chosen for this project is significantly lighter than conventional cast-in-place concrete deck systems, minimizing the load effects on the existing steel structure, thus reducing the amount of truss reinforcement required.
4.) Construction could be carried out with minimal traffic disruptions as the bridge could remain open to single lane traffic.

The project consisted of removing the existing bridge deck one lane at a time. Reinforcing the existing bridge truss system to meet current bridge design codes. Replacing the existing deck with high performance, precast concrete deck slabs, Prestressed in the transverse direction. The deck slabs were subsequently post-tensioned in both directions after placement. Composite action between the precast deck and the supporting structure was achieved by welding nelson studs to the stringers through ports provided in the precast slabs.
The project was broken up into three phases. The first phase was a demonstration phase intended to allow for minor modifications to optimize constructability during subsequent phases. Phase one was awarded to All Steel Coatings in 2001 and consisted of 42 deck slabs and 40 sidewalk curbs. The progression of the project exceeded everyone’s expectations and the Nova Scotia Department of Transportation gave the green light to proceed with the design of phase two. Phase two was awarded to All Steel Coating in 2002 and consisted of 168 deck slabs and 160 sidewalk curbs. Again everything went well and the design of phase three was completed. Phase three was tendered in 2003, and again All Steel Coatings was awarded project. This final phase consisted of 194 deck slabs and 192 sidewalk curbs. The total bridge deck is now replaced, on time and on budget. Precast Prestressed Post-tensioned deck slabs have proven to be a state of the art bridge deck system which can be utilized on both concrete and steel structures.