

The Lonely Lane

Only those who worked on the Central Artery/Tunnel Project will remember all the temporary works needed to make that project happen.

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The Lonely Lane is an expression for part of the traffic construction staging in the existing Dewey Square Tunnel on Boston's Central Artery/Tunnel (CA/T) Project. The Lonely Lane peels off the southbound mainline tunnel in Phase 10 of the project, surfacing in Chinatown on an old, rebuilt ramp. This lane is lonely because it has to weave its way through a construction work zone all by itself, taking a piece of the traffic demand away from the mainline tunnel that is restricted to two lanes. To understand the story of the Lonely Lane is to understand part of the mystery of construction staging.

One of the great achievements of the CA/T Project was the fact that it could be built at all. The CA/T structures are massive to start with, but they had to be built in the middle of congested downtown Boston. The project was committed to keeping all traffic moving, all utilities connected and the city functioning in and around the lengthy period of construction. To do this, while placing cut-and-cover tunnels 120 feet deep and seven boxes across,

became the Mother of All Construction Staging Jobs. One favorite early quip from local politicians was that it would have been easier to raise the city than depress the artery.

"Macro" & "Micro" Heroics

To support mitigation requirements, the designers had to apply all sorts of novel and complex methods. So, the existing artery viaduct was underpinned while the tunnel was dug below it. To keep the trains moving, three separate boxes were jacked below the railroad tracks while the ground was frozen above them. The project featured not one, but two separate immersed tube tunnels, and the project's signature cable-stayed bridge was built in tiny work zones surrounded on all sides by active roadways and facilities.

These design methods solved problems on a "macro" scale. Additional heroics were needed on the "micro" scale. Someone had to painstakingly track every traffic move, every utility connection, every aspect of the living city and match it against the construction requirements to build the needed facilities. The resulting plan was incredibly complex, with layers upon layers of stages, sub-stages and massive temporary structures to provide space for the work zones. To further complicate it all, the project had to be coordinated with adjacent projects such as the Amtrak Northeast Corridor Electrification program and many others. Work on the Massachusetts Bay Transit Authority's North Station job, for example, required building a double-decked

temporary ramp, with the upper level used for a highway exit from the artery viaduct and the lower level used for electrified light rail transit vehicles from the Green Line subway. The Mother of All Construction Staging Projects thus required the Mother of All Temporary Ramps.

Finding the Right Solution

With all of this complexity and myriad of choices, how does one pick the correct staging plan? Discussion of construction staging can be very subjective and, therefore, difficult to engineer and quantify. The overall problem is not bounded because one solution can be just as good as fifty others. The more complicated the staging, the less black and white the answer, and the more the requirement and opportunity for technical interaction. Often, a good solution is one that satisfies all the constraints without necessarily optimizing them.

Recently, tools have been developed to better define the realm of construction staging and permit more an objective comparison of options. For example, three-dimensional computer models can now be prepared to illustrate constructability issues and conflicts for different sub-stages. The process can be better costed using more detailed quantities and spreadsheets, as well as more accurate estimates of labor, schedules and impacts. Yet, even these spectacular advances are a little bit deceptive. For one thing, these more detailed analyses and models are still based on assumptions (and we all know what "assume" stands for). They are pretty much the same type of assumptions that were used before the computer came along, but now we have the ability of studying five hundred options instead of just three because automation has

freed us from a lot of the drudge work for the evaluation. In this case, it is possible to experience "computer freeze," where you end up studying so many options that you can't decide on any. It may seem better because we can generate five hundred options instead of three, but maybe it's not.

The perfect solution for evaluating two different staging proposals would be to provide access to an alternate universe. You could end up building the job one way in the present universe and the other way in the alternate universe. Then you could exactly compare which staging method worked best. So far, this construction staging tool is not available because if it was, we could also go back in time and rub it in at the meeting where the not-as-good option was proposed. Going back in time is another technology that is not currently available.

Back in the real world, we marveled at the sequence of construction as one segment after another of the Central Artery was opened for business. In a few short years, the final structures will seem like they were always there. The mystery and complexity of the construction staging will fade into the planners' memories. Maybe there will be a Central Artery Rest Home some day in the future. Engineers can retire to Boca (Raton, not the code) and sit on the porch on rocking chairs in a pleasant breeze, sip ice teas and reminisce about the glorious staging plans of days gone by and of the Lonely Lane.

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