

Title:

The CAT Magic Show

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Summary:

The Central Artery Tunnel (CA/T) video footage and documents show more than anchor bolt problems in Boston's Big Dig concrete. Contaminated concrete from recycled excavate was used in 3,800 million cubic yards of concrete construction. The CA/T documents should be examined for the chemical properties of the recycled aggregate soil and the concrete tested for corrosion and expansion contaminants.

Keywords:

Central Artery Tunnel, CA/T, video footage, anchor bolt, Boston Big Dig, concrete, contaminated concrete, recycled, recycled excavate, concrete construction, chemical properties, recycled aggregate soil

Article Body:

The gushing and fawning by Boston columnists over how quickly Governor Mitt Romney mastered the nuts and bolts of Big Dig information is frightening. I think his new found leadership is a diversion. In a slick show of "control" over the Central Artery Tunnel fiasco, Mitt commands respect with a flick of his magic pointer. The media swoon. It looks like a Boston rendition of Chicago; Bechtel as Roxie Hart kept safe and comfy in the lap of master puppeteer Mitt Romney, playing Billy Flynn. Nice guy, cute guy, downright lovable when he is home pretending he cares, great song and dance man, but there is more going on here than screwing in anchor bolts. Much harder questions need to be asked and investigated by the local media and by independent safety engineers to assure that no more 3-ton ceiling slabs land on commuters or travelers. But, as with any good magic show, Mitt has all eyes trained on the anchor bolts while he tries to convince the public jury that the real fault lies with Matt Amarillo and that Bechtel should be free to just walk out the door.

Just when we thought it was going to be safe to go back in the Central Artery Tunnels in Boston, the Governor let us know that more anchor bolts were faulty in several lanes of I-90 and perhaps in more tunnels. One of the problems with listening to Governor Romney, Turnpike Chair Matt Amarillo or most CA/T predecessors is that they are lawyers and businessmen, not engineers. So take a minute during Mitt's Magic Show to visit the CA/T with my tunnel vision because

something does not smell right. Even though the laser light is dazzling and the hard hat adds such charm. I'm not ready to clear the deck of the Super Scoop barge for a decisive victory photo-op.

First, take a really close look at the failed epoxy holding the anchor bolts that suspend the 3-ton concrete ceiling panels. Here are some of the easy to follow instructions for construction workers regarding epoxy-  
"Prior to application, all areas must be free of contamination such as waxes, oils, loose concrete, dirt, curing compounds, etc. Acid etching, followed by proper neutralization and rinsing, is usually acceptable if the concrete is in excellent condition, not contaminated." (emphasis mine).

Drum Roll-Mitt shines a laser light into the dark tunnel and we hear the "ooows" and "ahhhs" over the new, shiny anchor bolts, and a slight of hand trick begins. Will the rabbit now stay in the hole or pop out of the hard hat?

Wake up. Remove your gaze from the anchor bolts and focus on the other end of the suspension rods within the ceiling panels themselves. We see a concrete ceiling with newly tightened anchor bolts on the top and steel cable rods embedded in 3-ton concrete slabs suspended beneath on the other end of the cable. No steel beams exist in the I-90 connector to create the desirable steel-bolted-to-steel infrastructure. So any suspended cable will only behave as well as the concrete on either end allows it to behave. If I put an anchor bolt in a wad of silly putty and hang a rod embedded in 5 lbs. of modeling clay from it...well it's hanging there with a limited lifespan, I don't care how new the anchor bolt might be.

Anchor bolts will mean very little if this construction mess in downtown Boston is the result of mixing contaminated dirt and fill into the composition of the concrete ceiling, walls or floor. Here is how the trick might have been done:

(1) While most eyes follow the light and focus on anchor bolts, our current investigation shows that there is a global demand for recycled construction products. This demand has increased substantially during the past two decades. The Big Dig produced over 4,000 miles and over 11 million cubic feet of dirt in the early digging stages. Most of this dirt and debris was processed for contamination and recycled into the Big Dig as clay landfill capping material, project backfill and as aggregate (mix) for the tons and tons of concrete needed for the project. The miles of extra dirt came from the demolition at the airport, the dredging of the harbor floor by the Super Scoop for the Ted Williams Tunnel, the digging of the coffer dam, excavation of miles underneath downtown Boston for the Tip O'Neil Tunnel, digging out tunnel entrances, etc.

In Big Dig II: Down Under, co-producer Arnie Reisman and I investigated this

dirt and decided to follow the good news. The uncontaminated clay portions of this fill were going to be used to cap Spectacle Island and hundreds of Massachusetts landfills, an appropriate reuse of heavier clay materials. We were assured that there was a dirt-testing lab and that all of the contaminated soil was being properly distributed and reviewed by the Department of Environmental Protection (DEP). We were handed stacks of literature, interagency agreements regarding contaminated materials and many, many press releases about the massive volume of dirt being tested and processed. Occasionally there was other good news on the disposition of the dirt. There were mountains of dirt and any disposition was cause for celebration. After all, any unused dirt was going to cost the project and the managers big money for disposal.

(2) Digging back through my Big Dig materials I unearthed a 1992 Memorandum of Understanding between the Department of Environmental Protection and the Massachusetts Highway Department about the "contaminated materials" in the soil. This addressed the process for oversight and inspections of the dirt for specific chemicals contaminating the soil that are harmful to humans and wildlife. Of course, those employees at the state DEP who were "overseeing" the process with the Big Dig were salaried by the Massachusetts Highway Department and the Central Artery Tunnel Project. We won't even begin to examine that closet. Why? Because right now we are trying to figure out the rabbit in the hat for Mitt's Magic Show about the anchor bolts.

(3) During construction, there seemed to be an ongoing safety process regarding the concrete. Footage in Big Dig IV: Still Working contained a segment on the concrete testing process that was overseen by the Joint Venture of Bechtel and the Massachusetts Highway Department. This footage will soon be available at our web site, PolarisProduction.com where we will also uncover what we consider to be the design change that is causing continuous leaks in the I-93 tunnel.

This past winter, a small Big Dig contractor was accused and indicted for allegedly mixing too much old concrete in with new concrete to create a substandard mix that may be contributing to some leaks in the I-93 tunnel underneath Boston. This was a red flag that something may be NOT O.K. with at least some of the concrete but no one really noticed.

(4) By looking carefully at the Memorandum of Agreement it is obvious that the chemical contaminants in the DEP agreement are not the same chemical contaminants that can be harmful to the strength of the concrete or to the tendency of certain chemical contaminants to corrode embedded steel. When certain chemicals are present in the sand and soil used as the "aggregate" or the mixing soil that is added to cement to make concrete they can weaken or affect other properties of the concrete. These effects may happen over time and

consequently may not be detected using temperature and slump tests on the not-yet-hardened concrete. The Joint Venture (the state and Bechtel) was required to sample portions of the concrete in all Big Dig contracts for strength. If the aggregate used to make this same concrete contained chemical contaminants that do not affect concrete strength, but can corrode steel fittings rapidly how would we know? Well, obviously we check the standards, right? That way we always mix in aggregate that does not contaminate the concrete in ways that can be disastrous.

When I looked for national standards on chemical contaminants and concrete mix, I found only an early attempt in Australia (1994-1996) to develop such construction standards for recycled material used in concrete construction. Many more Internet references attested to a lack of the type of precise testing over time that could lead to such standards. Perhaps the CA/T was following a set of engineering standards of which I am not aware. Of greatest concern is for the public to be informed about which chemical contaminants can affect the strength and durability of the concrete and which were present in what percentages in the recycled fill used throughout the CA/T tunnels. It is particularly important that an independent evaluation team makes a thorough investigation of the chemical properties of the recycled aggregate soil used throughout the project. This could help to identify areas that can be expected to have premature corrosion of steel rods embedded in concrete or that cause the concrete to expand or crumble or leak.

So 12 years of Republican controlled reassurances that the harmful soil was being disposed of properly failed to explain to us that the tests were only for the chemicals and soil properties directly dangerous to humans, for example, piles of dirt that contained mercury. The tests and press releases from the CA/T in 1991-1995 did not describe the concentrations of chemical contaminants in fill that could cause premature collapse of the tunnel ceiling or walls from faulty concrete. We have those listed on our web site at our web site, [PolarisProduction.com](http://PolarisProduction.com) . We would appreciate hearing from any students, engineers or chemical engineers who can provide clarification on this matter. We will post your information and we will post any established standards for contaminants used in concrete aggregates along with any standards used by the CA/T in disposition of the dirt back into the Artery construction.

While we will continue to investigate this potential concrete catastrophe and review the documents and tapes at our disposal, someone with far greater resources, like the mainstream media needs to examine the CA/T deals made with contractors. How much of the previously used dirt and debris from demolition, dredged or excavated material were each of these contractors required to reuse in their concrete? Was it tested for the road salts and other contaminants that

may not be immediately harmful to people and therefore ruled usable by the DEP? Were those contaminates in sufficient quantity to pose problems as a concrete aggregate? Does the effort to get rid of over 4,000 miles of soil through recycling and to save money or make money from disposal of the fill now threaten our lives when we drive through 3.8 million cubic feet of weakened or corrosive concrete? Our future could depend upon understanding the nature of these man-made caverns before the Big Dig becomes the Big Tomb. Remember, look beyond Mitt's Magic Show to see how this rabbit was stuffed into the hole in the first place.

Next we look at the design change that may be the primary cause of I-93 tunnel leaks. This one change might have set in motion an on-going set of problems with downtown leaks in Boston's Central Artery/Tunnel.

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