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CALL7 Investigation: State Bridge Inspections Obstructed

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CDOT: Obstructed Views Not A Critical Public Safety Issue

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DENVER -- There is something inside a number of Colorado bridges that may be hiding problems, but until CALL7 Investigator John Ferrugia started asking questions, the executive director of Colorado Department of Transportation didn't know about it.

"This is not a safety risk at this point and time. It's not. All of the bridges are aging and no one has told me this is a current safety crisis," CDOT Director Russ George said.

While it may not be a safety "crisis," as George termed it, CDOT bridge inspectors have, for years, expressed concern and frustration in their inspection reports and memos. Their concern is focused on the inability to visually inspect key areas of certain bridges because their access or view is obstructed by wood forms left behind by construction crews.

For example, a December 2007 memo regarding the flyover from southbound Wadsworth to Interstate 70 reads, "Our bridge inspectors have not been able to access the interiors of the steel boxes during the last three inspections due to failing interior formwork that was never removed."

The memo continues, "Please remove the... formwork so that we can complete the federally mandated bridge inspections."

The memo was not copied to George, but was sent to CDOT bridge maintenance and several managers as well as the Federal Highway Administration.

The inspectors' frustration deals with "box girder" bridges built before 1991. Box girders are essentially hollow concrete or steel boxes set on pillars to support the deck and roadway of a bridge. While under construction, wet concrete is held in place by wood forms such as plywood and two-by-fours, some of them inside the box girder. Steel rebar helps to reinforce the concrete and steel crossbeams help to reinforce the girder.

Once the concrete hardened the wood forms should have been removed, but in at least 17 box girder bridges identified by CDOT inspectors the forms were left in place, preventing inspectors from properly examining the concrete and steel inside the box girder.

"I don't know what all has been going on. All I know is inspections have continued and there is nothing to show that any of these box girder bridges is a safety problem because of these timbers. That, I do know," said George.

7NEWS spoke with several outside experts, including bridge inspectors, civil engineers and builders, all of whom disagreed. They, too, believe it is not a "crisis" but said anything that hampers an inspector's ability to properly complete the job is, in fact, a safety problem.

"We could have some serious deterioration going on behind some kind of hidden feature that might be a key



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structural member and we could get some sort of a failure at that spot," said Dr. Kevin Rens, a professor of civil engineering and a bridge expert who has conducted inspections.

He is studying bridge deterioration and safety at the University of Colorado, Denver.

"Where we have formwork left in place, it's only going to make the situation worse because we cannot see the underside of the concrete deck, for example, any cracking that might occur in that spot," said Rens.

Another problem -- the wood left behind can act as a sponge, trapping water and deicing chemicals. The chemicals can be corrosive and the trapped water, freezing and thawing, can crack the concrete supporting the bridge deck.

"And then what happens?" Ferrugia asked.

Rens replied, "It's going to corrode the steel."

"If these forms are holding this in like a sponge, could that have significant impact on the safety of a bridge?" Ferrugia asked.

"Certainly. Yes, it can," said Rens.

Wood forms left in older box girder bridges is not new to CDOT. Reports from the aforementioned flyover at Wadsworth and I-70 show inspectors noting the problem as far back as 1997.

Six years later, at the same bridge, an inspector did not even attempt to check the inside, writing in his report, "Girders were not entered on this inspection due to dangerous formwork left in place."

CDOT records indicate the inside of the box girders on the Wadsworth ramp have not been fully inspected inside since 2001.

George told Ferrugia that getting inside a box girder "would no doubt give us a better view, but that does not by itself, because it isn't done, tell us that the bridge is unsafe. That's just not true."

"There are any number of ways you can inspect a bridge and determine its condition and safety," George said.

"Hands-on inspections to see the deterioration of the concrete is vital," said retired CDOT supervisor Al Payne, who worked in bridge maintenance. We found his name on several memos addressing the issue of forms left in girders. He was stunned to hear what George had said in the interview.

"Being able to see, visually, what is going on inside a bridge is like a doctor looking to the inside of you. You need to know what's there and how it's functioning, if it's a safe bridge or not," said Payne. "We had a couple of bridges that we did deck rehabs on, only to find when we popped off the concrete that the steel was gone."

One example is the McIntyre Street Bridge over Highway 58.

Inspection notes dating back to 2003 read, "Majority of deck bottom not seen due to timber formwork left in place inside box girder."

The deck of the McIntyre Street Bridge was recently replaced and a representative for CDOT told 7NEWS, "The primary cause for the deterioration ... was the absence of a waterproofing membrane under that asphalt riding surface."

While CDOT attributes the deterioration of McIntyre Street Bridge to a lack of a membrane, the statement did not address the inspector's inability to completely check the inside of the box girders on that bridge and is, in part, contradicted by a CDOT e-mail reading, "Factors contributing to excessive eroision (sic) of bridge steele (sic) and concrete: Wooden Deck Shoring left in place."

CDOT has provided no documentation of any specific plan to clean up the more than dozen bridges in the Denver area with accessible box girders, despite a January 2008 recommendation from the Federal Highway Administration to make it a priority on fracture critical bridges.

In fact, in the report, it was the highway administration's top priority for Colorado.

In an e-mail to 7NEWS, a CDOT representative wrote, "These approximately 17 bridges that need formwork removal make up only 14 percent of the approximately 118 box girder bridges with internal access."

Our investigation found many of those bridges are on the state's highest traffic areas like I-70 and I-25.

CDOT officials told 7NEWS, while there may not be any specific plans in writing, they said the issue has been discussed in numerous meetings and provided 7NEWS a spreadsheet indicating work to remove wood forms on 12 bridges was issued August 2008.

Internal CDOT e-mails indicate a completion date of August 2009, yet we found no evidence any work is under way and the spreadsheet notation for each bridge reads, "Design in Progress."

"When you left on October 31st of last year, what had been done as a plan to mitigate this?" Ferrugia asked Payne.

He replied, "Nothing. Nothing that I was aware of."

"The labor to remove them is an enormous amount of work. It's a multi-person job. You have to get all kinds of equipment up through the porthole to be able to take it down. Power, lighting, all the safety equipment ... it does become a very labor intensive job," said Rens.

And an expensive one -- a bid to remove more than 300 sheets of plywood, other lumber and to clean out pigeon feces from one box girder bridge was \$112,000.

CDOT told 7NEWS in an e-mail, "We have a running list of a number of other urgent bridge needs. This has never been identified within CDOT as being a critical public safety problem."

While the situation may not be a "critical public safety issue" at this time, our investigation found some inspectors believe it is a serious problem.

In August, 2008 the head of inspections sent a memo to maintenance and several CDOT managers naming a dozen area bridges in which, "The formwork keeps bridge inspectors from being able to properly inspect bridges creating a potential safety hazard should a problem arise that can't be inspected."

A week later, an internal e-mail copied to his bosses reads, "We are feeling uncomfortable as to what we might be missing during our routine inspections."

When Ferrugia asked George about the inspector notes, he said, "There certainly has been no briefing directly to me as would be the case if we had a significant problem that needed to be brought to the top of the priority list."

"I don't think, from what I've learned so far, that's where we are here."