

NW-12 Vault

Thursday, July 24, 2025 3:03 PM

8/20/25 - Jason, Terry, Alan, Sam, Zach, Jon, Ryan, Kurt

- Spalls on the corners
 - No rebars exposed
 - Result of the binding
 - Look in the joint - don't have the gap maintained



- Zach think this looks like the panel hit the one next to it and created that spall
- Repair resolution
 - Fine to patch
 - BUT if there is insufficient gap - need to trim or sawcut?
 - Trim or maintain the gap (should be 3/4")
 - Ensure that post construction settlement won't cause a further spall
 - Sawcut or grind
 - Doesn't meet 1/2" gap - trim
- Moment slabs
 - At/or with post construction settlement
 - Panel is required to be recessed into the bottom of the moment slab
 - Tail brought down farther or panel extended
 - Maintain 2" extension - Jason NCR from Renton to Bellevue
- Connections
 - Went to where the wall was most out of plumb
 - No deformation, elongation, signs of stress
 - Measured back of panel to end of mesh - was still 12'
 - No elongation in the soil reinforcement
 - Wall moved as a block... per Sam - don't say that to the geotechs
 - Checked three spots - one where nothing happened
 - Soil reinforcement connection at the panel seems to be fine
 - This captures service load
 - Doesn't include live load and remaining load of the roadway
 - Has been subject to full service load with test pile
 - Good that there is no inelastic deformation
 - Doesn't capture strength or extreme
 - Testing for development of wall
 - Pulled and observed behavior and measured displacements that occurred
 - What is the additional p delta coming over
 - Hand calc
 - Out of plumb
 - There is a force being applied differently than normal since it is not plumb
- Outfalls
 - Go Pro on a 2x4 with 3" go pro - ran it 14' into the wall with no obstructions
 - Didn't get a perfect camera in there (dark after 5')
 - Underdrains are at the back of the reinforcement zone
 - No ponding (2x4 didn't get wet)
 - Also not raining :)

8/19/25 - Jason

Amy called Jason

- What did she review?
- Load rating with a shored structure
 - Here is how we think the structure will respond
- Still questioning the modeling of the DOKA post
 - Axial stiffness of the post relative to the stiffness of the slab
 - If the concrete doesn't deflect enough to pick up the load - it won't do what it is intended to do
- Amy seemed ok - if this was a steel member that a consultant was designing - LRFD - welds, nut and screw (how much shear per thread) how much torque, positive connective,

- bending stresses in the base plate
- Amy wants to support the process - needs to feel comfortable that we are doing our job to make sure this post is ok
 - Doesn't want to say - no it can't be there
- WOULD FORREST BE OPEN TO TALKING AGAIN?
 - Some error is happening that the bottom is failing...
- **Could the single span load rating be submitted as well???????**

8/18/25 Meeting with DOKA

Justin Lunday, Pietro Da Sacco, Evelyn, Dan, Jason

Pietro has been in contact with Skanska - screw jacks

- Doka didn't have any input in this
- Skanska asked us to get on with WSDOT and talk through this
- DOKA EU EX 30

Justin reviewed the design earlier today

- Pretty straightforward
- Load assumptions he didn't review
- Usually used for dead and some live loading - vibrations
- Props can come loose and fall over without a positive connection to the slab
 - 3" bolt into soffit of the culvert - usually don't want to do that (don't want to hit the post tensioning)
 - Have a spring that can be used
- As long as it is under 8.5 kips - capacity of the prop is inline with our information

Prop needs to be plumb - need to have it

- 3/4" plywood shim - accounting for this

Condition of the props need to be checked

Anchor bolt would need to be tightened - fixed at the top

Steel posts - intended for large scale construction projects - timeline isn't concerning to the team

- Average lifecycle is 7-10 years
- Inspected prior to going out to jobsites

Quality Assurance prior to renting/selling again

- If they get dented (bottom of the prop is caved in on the outer tube)
 - Easier to hammer this out version loosen the screw
- Run over - crunched

If the movement is our concern - could they tack weld it?

Could Doka inspect - MAYBE - kind of a means and methods sort of thing

Certification - could be accomplished - would have to pay them - train on what to look for

8/5/25

Mohammad (Mo) Al-Salman, Mohammad (Reza) Sheikahadi, Jason Pang, Evelyn Pao, Forrest Megargel, Jessica Merrell, Zach Lucarelli, Danny Snyder, Kyle Sharrer

Changed critical sections at corners, at rest forces, critical haunches at the walls

Biggest change - under haunch

2 lanes on the vault - per BDM - specifies to use single lane distribution and provide a live load factor of 2 - that is the basis for load rating

Unshored - WSDOT is ok with HL-93 rating factor being less than 1. Mo Al-Salman - Legal loads (WA-105/Type 3/ Type 3-3) EV3 is below - will post for emergency vehicle - NOT a big concern

RATINGS SUMMARY							
		Flexure			Shear		
Truck		RF(INV)	RF(OP)	Controlling Point	RF(INV)	RF(OP)	Controlling Point
(AA)	HL-93	0.69	0.89	Top Slab, MID	1.58	2.05	Top Slab, RT
(AB)	WA-105	1.00	1.00	Top Slab, MID	2.42	2.42	Top Slab, LT
(AC)	EV 2	1.12	1.12	Top Slab, MID	2.34	2.34	Top Slab, RT
(AD)	EV 3	0.85	0.85	Top Slab, MID	1.91	1.91	Top Slab, LT
(AE)	NRL - Le	1.48	1.48	Top Slab, MID	3.20	3.20	Ext wall, TOP
(AF)	NRL	1.00	1.00	Top Slab, MID	2.42	2.42	Top Slab, LT
(AG)	OveLoad	1.32	1.32	Top Slab, MID	3.21	3.21	Top Slab, LT
(AH)	OveLoad	1.32	1.32	Top Slab, MID	3.21	3.21	Top Slab, LT
(AI)	Type 3-3	1.22	1.22	Top Slab, MID	2.90	2.90	Ext wall, TOP
(AJ)	Type 3	1.00	1.00	Top Slab, MID	2.42	2.42	Top Slab, LT
(AK)	Type 3S2	1.10	1.10	Top Slab, MID	2.70	2.70	Top Slab, LT

Mo does not need to see this as a box.

WSDOT is ok - 4M needs to be ok

If simplified rating - feel uncomfortable - more than welcome to do a more refined or perform a load testing. The shored approach will not be accepted

Culverts - fail under the dead load

Temporary shoring - ok - but if designed for this application/installation - that is where the screw jacks aren't working?

Mo Al-Salman - ok with what they did today, ok without shoring, ok with shoring. WSDOT is ok... WHAT? Are we ok because what we saw today works?

AFTER CALL

- Mohammads don't expect catastrophic failure - cracking in the pavement would show failure
- Proof testing - allow traffic on the culvert
 - After a few weeks or months - proof of concept
- AASHTO - requires shear failure
 - WILL NOT HAPPEN WITH A CULVERT
 - Flexural failure - when inspecting - will see these issues
- What happens if there is cracking
 - Was the fill compacted correctly?
 - Mo does not expect the structure to fail
- IF THEY WANT THE SHORING IN - NEED FULL DESIGN for support of screw jacks

7/31/25

Mohammad Al-Salman, Mohammad Sheikahadi, Jason Pang, Terry Bondy, Amy Leland, Evelyn Pao, Forrest Megargel, Jessica Merrell, Zach Lucarelli, Danny Snyder, Kyle Sharrer

Truck	Flexure			Shear		
	RF(INV)	RF(OP)	Controlling Point	RF(INV)	RF(OP)	Controlling Point
(AA) HL-93	0.25	0.32	Ext Wall, BOT	1.27	1.65	Bottom Slab, RT
(AB) NRL	0.33	0.33	Ext Wall, BOT	2.02	2.02	Bottom Slab, LT
(AC) Type 3	0.33	0.33	Ext Wall, BOT	2.02	2.02	Bottom Slab, LT
(AD) Type 3S2	0.35	0.35	Ext Wall, BOT	2.21	2.21	Bottom Slab, LT
(AE) Type 3-3	0.34	0.34	Ext Wall, BOT	2.14	2.14	Bottom Slab, LT
(AF) Overload	0.56	0.56	Ext Wall, BOT	3.27	3.27	Top Slab, LT
(AG) Overload	0.55	0.55	Ext Wall, BOT	3.20	3.20	Top Slab, LT
(AH) EV 2	0.38	0.38	Ext Wall, BOT	1.97	1.97	Top Slab, RT
(AI) EV 3	0.40	0.40	Ext Wall, BOT	2.09	2.09	Top Slab, LT
(AJ) NRL - Le	0.39	0.39	Ext Wall, BOT	2.64	2.64	Bottom Slab, LT
(AK) WA-105	0.33	0.33	Ext Wall, BOT	2.02	2.02	Bottom Slab, LT

- Have you considered using a pin and not a rigid connection - exterior walls are controlling
- In the shored scenario - needed to have pin connection for the shoring pos
- What changes
 - Top slab, exterior rebar, corner rebar
 - Corners and back face of the wall is part of the problem

DOKA - response - doesn't answer the question

Hi Zach,

I'm looping in Danny Torrez, our Large-Scale Projects Account Manager, as he's received similar inquiries from Danny Snyder (also copied here) at Skanska.

Below are links to our Euxex props, which are part of the Dokaflex shoring system, along with additional considerations outlined in our Calculations Guide (clip below).

Dokaflex S: <https://link.digitaldoka.com/dokaflex-ujg-102018>

See below Reshoring clarification, although, it appears your team has already designed with supporting calculations:

Doka does not provide Reshoring calculations or design which is based on concrete design strength, maturity level, pour cycles, etc. This is outside of Doka's area of practice and expertise. This responsibility and scope fall under the Building Structural Eng service* based on customer-defined parameters. It must be clearly stated on the drawings that Prop locations, sequencing, and the number of floors is determined by the contractor and/or SE / Eng firm and Doka can clearly state the reshoring loads per external engineering firm contacts if a Building SE is unavailable.

Let us know if you have any questions or need further clarification.

Eurex 20, Eurex 30 and SD		
Type of Doka floor prop	As single Post System and for Reshoring in the USA FOS 3:1	Used in a system like Superdek [®] , Dokamak [®] Table Heads and for Reshoring in Canada, FOS 2.5:1
Eurex 20 (top)	6.0 kip (26.7kN)	7.2kip (32.0kN)
Eurex 30 (top)	8.5 kip (37.8kN)	10.2kip (45.3kN)
Eurex 20 (top) with Extension 50cm ¹⁾	6.0 kip (26.7kN)	7.2kip (32.0kN)
Eurex 30 (top) with Extension 50cm ¹⁾	7.8 kip (34.7kN)	9.4kip (41.6kN)
Doka Floor Prop SD 350 with extension length and with Extension 50cm	≤ 3.00m	12.4 kip (55.1kN)
	≤ 3.50m	11.4kip (50.7kN)
	≤ 4.00m	10.1kip (45.1kN)

¹⁾ In Doka Table Forms only up to a combined length (Prop plus extension) of 14'-9 1/2" (4.5m).
²⁾ The Head Height of a Formwork System influences these allowable values – see e.g. chapter Superdek for more information

Table 105: Allowable Load for Eurex 20, 30 and SD according ANSI A10.9-2013 and ANSI/SSFI SH300-2007

Typical shoring - design for dead load plus live load - no factors

Rating factor of the post isn't controlling in this situation

7/24/25

Greg Seipel, Cameron Reece, Mohammad Al-Salman, Mohammad Sheikhabadi, Jason Pang, Evelyn, Dan

- Greg - 4 access hatches and safety plan reviewed by WSDOT - closes the access concerns
- Initial inspection needs to be completed within the first 90 days of traffic being on
 - Will need to coordinate with Skanska to get TC support
 - Frequency of inspection (weekly by Skanska) acceptable to Greg

Load Rating

- Verified top and bottom steel in the top slab and the walls
 - Chipped out and identified
 - Requested photos
 - 60 ksi on rebar was written in field
 - Core test on concrete

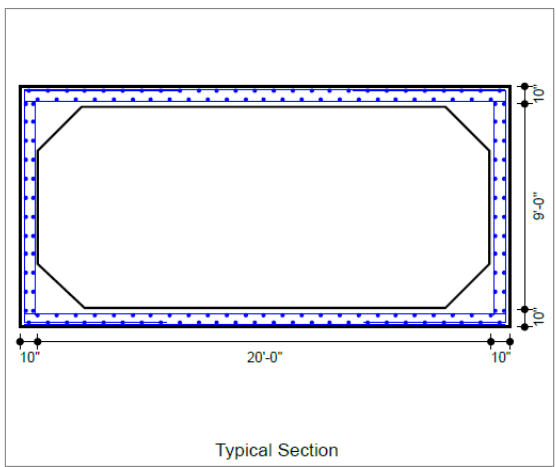
- 6500 psi
- Mohammad S. - not sure why we would allow them to test the concrete and use that strength (concrete gets stronger over time)
- Mohamad A. - not concerned with the concrete strength - concerned with the jacks - takes back the comment - cannot use one sample for the entire vault (300')
 - Can buy 3-4 ksi concrete
- Modelling middle pole brace as a 6" thick wall
- Design the middle wall
 - Then backing it out to get the post size
- Posts
 - Only taking live load and dead load from the pavement
 - Mohamad A. - he can buy that - dead load of the structure is already at the sides
 - Takes no issue with that
 - Concern goes back to the posts



- - Greg - agree this is a concern - that is why they are being inspected weekly to start
 - Don't have anything from the manufacturer saying that these are intended for use in this kind of location, for this kind of loading, for this kind of duration
 - Internet search - not used for anything like this
 - THEY NEED TO BE AWARE - IF THERE ARE ISSUES - WE WILL SHUT THEM DOWN
 - Mohammad A.
 - Asbuilt condition of the box - why using pinned connection - haunches usually indicate a pinned condition
 - If that is a fixed connection - someone buys off on the reinforcing that they say it is
 - What happens if we model it without the supports to see if they are needed
 - Don't care about HL-93 - but care about legal loads
 - Other loads can be managed

◦ First load rating

Concrete	Strength, f _c :	5 000 ksi		
	Density:	0.150 kcf		
	Elasticity, E _c :	4592 ksi		
	Type:	Normal wt		
Steel	Yield, f _y :	60 ksi		
	Allow Stress:	36 ksi		
	Elasticity, E _s :	29000 ksi		
Soil	Density:	0.120 kcf		
	Exposure Factor			
	User-Defined:	1.00		
Reinforcement Covers	Ext. Cover Top Slab:	2"		
	Ext. Cover Bottom Slab	2"		
	Ext. Cover Walls	2"		
	Int. Cover Walls	2"		
	Int. Cover Top Slab	2"		
	Int. Cover Bottom Slab	2"		
Controlling Ratings				
	Inventory Rating:	1.00		
	Operating Rating:	1.00		
Loads				
Live Load	Vehicle Names:	HL-93 Type 3S2 Overload 2 NRL - Legal Lane	NRL Type 3-3 EV 2 WA-105	Type 3 Overload 1 EV 3
	Traffic Direction:	Parallel		
	Eq. Height of Soil:	Calculated		
Dead Load	Future Wearing Surface:	0.000 klf	Lateral Soil Loads	60.00 pcf
	Additional Dead Load:	0.000 klf	Eq. Fluid Press. Max:	20.00 pcf



Additional Dead Load:	0.000 klf	Eq. Fluid Press. Min.	50.00 psi
Concentrated Loads:	none		
Interior Water Pressure:	yes, head pressure = 3 ft	Water head inside and outside the culvert are assumed to be approximately equal	
Exterior Water Pressure:	yes, head pressure = 3 ft		
			4

- Parallel should be perpendicular
- Soil Density looks low - usually low is 130 pcf
- Go back to normal
 - Rerun it that way to see where numbers are at
 - Perpendicular and not parallel
 - If close enough to 1 for all legal loads
 - If there is a traffic barrier - needs to be accounted for in the loading 600 lb/LF

Contractual language - they are NOT meeting AASHTO

This is not proper installation of these

