

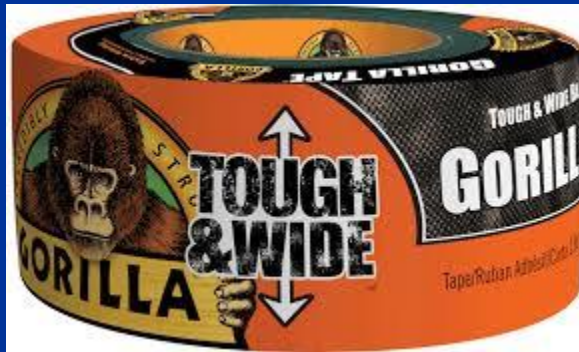
Montgomery County's Emergency Bridge Repairs

Stephanie Goff, P.E., P.S., Senior Engineer

Ben Moore, Bridge Superintendent



Duct Tape, Gorilla Glue and Flex Seal can fix all, Right?



Overview

- Emergency repairs/modifications we have made with our crews to slab and box beam bridges to keep them open to traffic until they can be replaced
- Some repairs made with our crews to repair damaged bridges/culverts to extend their life
- Non-traditional methods used for construction with our crew

McEwen Bridge



- 4 Span continuous reinforced concrete slab with cap pile substructure
- Spans: 38'-47'6"-47'6"-38'
- Roadway 44' f/f guardrail
- Built 1983
- Bridge to be rehabbed in 2018

McEwen Bridge

Bridge Overall Condition



McEwen Bridge

Bridge Condition 2011



McEwen Bridge

Jacks Added in 2012



McEwen Bridge

Jacks Added in 2012



Lyons Bridge



- 4 Span continuous reinforced concrete slab with cap pile substructure
- Spans: 32'-40'-40'-32'
- Roadway 68' f/f guardrail
- Built 1984
- Bridge to be rehabbed in 2022

Lyons Bridge

Condition 2013 Inspection



Lyons Bridge

Condition 2014 Inspection



Lyons Bridge

Condition 2014 Inspection



Lyons Bridge

Condition 2015 Inspection



Lyons Bridge

Condition 2015 Inspection



Lyons Bridge

Condition 2015 Inspection



Lyons Bridge

Condition 2015 Inspection



Lyons Bridge

Jacks Installed in 2016



Lyons Bridge

Jacks Installed in 2016



Alex Bell Bridge



- 3 Span prestressed concrete adjacent box beams on reinforced concrete piers and abutments on piles
- Spans: 39'2"-40'5"-39'2"
- Roadway 36' f/f guardrail
- Built 1982
- Bridge to be rehabbed in 2017

Alex Bell Bridge

Condition in 2016



Alex Bell Bridge

Condition in 2016



Alex Bell Bridge

Condition in 2016



Alex Bell Bridge



Alex Bell Bridge

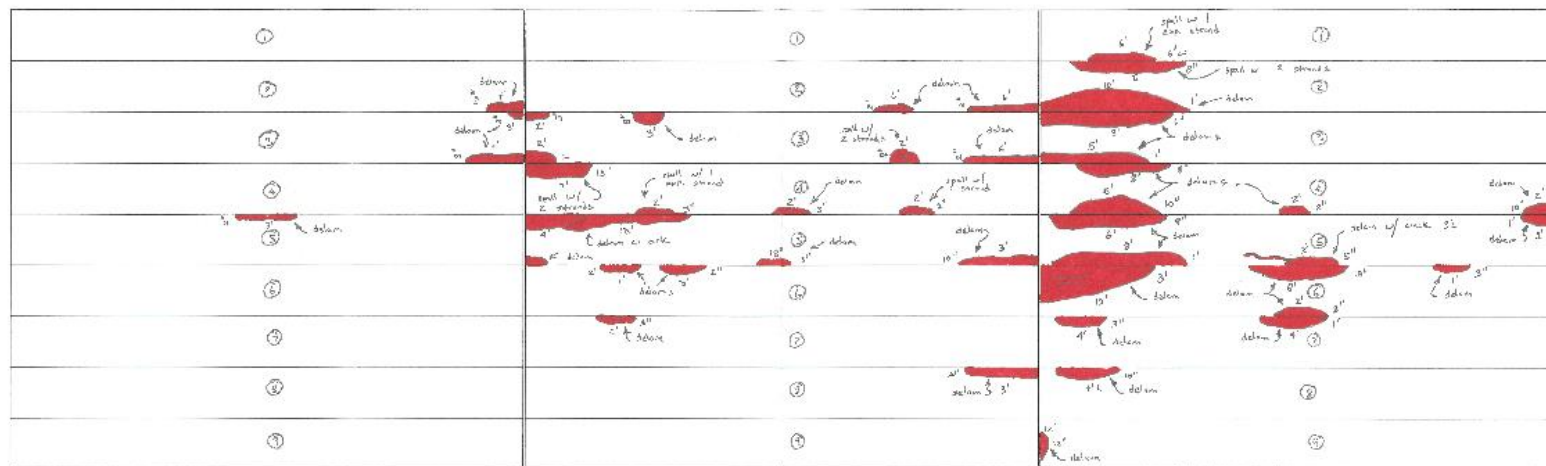


not to
scale

SPAN 1

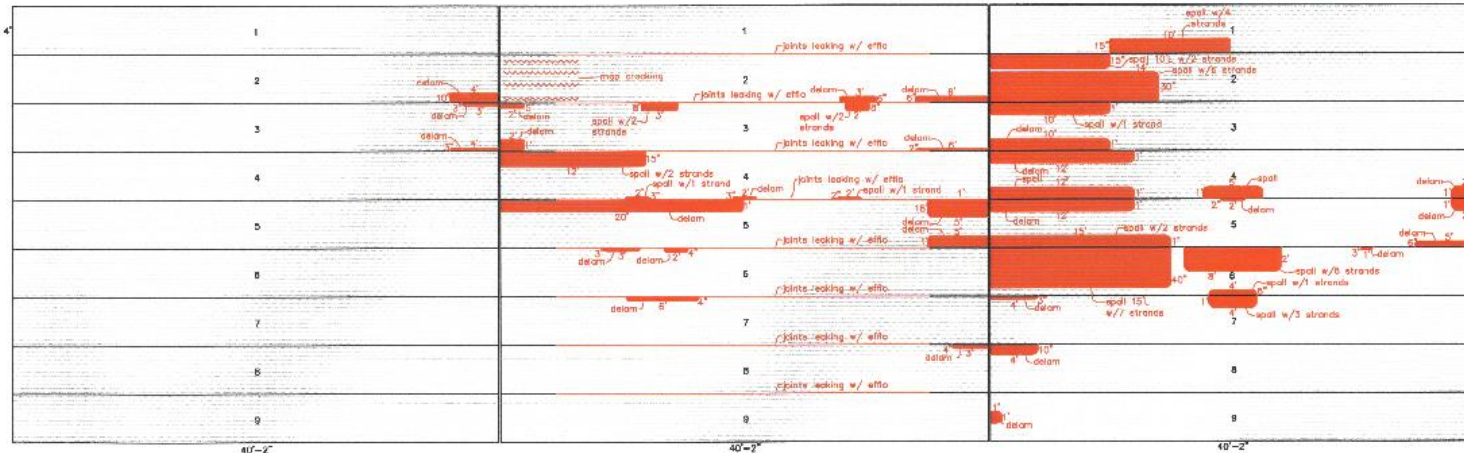
SPAN 2

SPAN 3



Alex Bell Bridge

Alex Bell Road
Superstructure Inspection Drawing
Washington Township
WHG-C0078-1.52
5752531
 $\frac{1}{8}'' = 1'$
8/16/2016



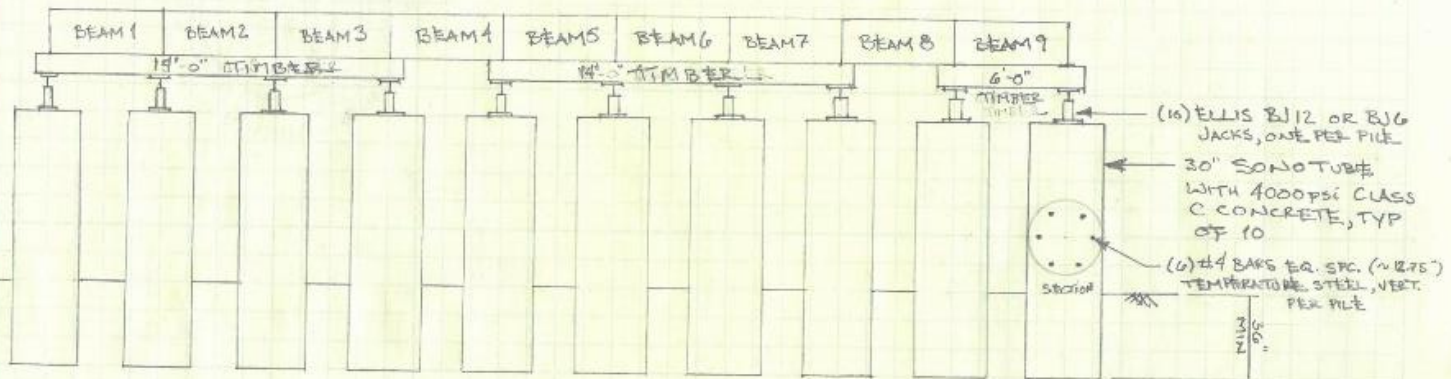
Alex Bell Bridge

4/4
8/15/2016

DAVID SHIELDS

ALEX-BELL TEMPORARY
PIER DESIGN

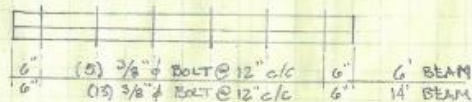
1248-78-1.52



TIMBER SPECS: SOUTHERN PINE, NO 2 GRADE, OR BETTER
 $F_b = 0.850 \text{ ksi MIN}$
 $F_v = 0.165 \text{ ksi MIN}$

(2) 6x6 NOMINAL DIMENSIONS, MINIMUM, BOLT LAMINATED, SEE BELOW
 INCKING FOR TREATMENT PERMITTED

LAMINATING DETAIL:



Alex Bell Bridge

Temporary Shoring added in 2016



Alex Bell Bridge

Temporary Shoring added in 2016



Alex Bell Bridge

Temporary Shoring added in 2016



Alex Bell Bridge

Temporary Shoring added in 2016



Alex Bell Bridge

Temporary Shoring added in 2016



Alex Bell Bridge


Temporary Shoring added in 2016



- Was able to get the lumber from Home Depot in stock

Ellis Jacks

Adjustable Steel High Load Bridge Jack - Ellis Manufacturing Co. Page 3 of 10

 **\$210** per BJ-3 1 reviews

The Ellis Bridge Jack / Modular Building Jack can support up to 80,000 pounds. It is the most rugged and durable screw jack Ellis offers. This screw jack comes standard in 4 sizes, see below for details.

Availability: In Stock

Item # Quantity

Make Selection

Item #	Range Of Adjustment	Safe Load Capacity	Weight	Price
BJ-3	10" - 13"	80,000 Lbs.	50 lb	\$210
BJ-6	13" - 19"	80,000 Lbs.	60 lb	\$241.25
BJ-9	16" - 25"	80,000 Lbs.	63.5 lb	\$263
BJ-12	19" - 32"	80,000 Lbs.	70 lb	\$283.75
BJ-21	29.5" to 50.5"	80,000 Lbs.	117 lb	\$368.75

share:

<https://ellismanufacturing.com/collections/screw-jacks/products/ellis-bridge-jack> 3/22/2017

- Top and bottom plates measuring 1/2" x 9" x 9" for support, the ACME screw is 2 and 1/2" diameter and greased for easy turning and capable of extending a full 3" (BJ-3), 6" (BJ-6) and 12" (BJ-12).
- The Ellis bridge jacks while weighing 45 lbs (BJ-3), 60 lbs (BJ-6) and 70 lbs (BJ-12) can support loads up to 80,000 lbs
- While the jacks were tested for over 200,000 lbs, they recommend applying a 2.5 to 1 safety factor when gauging the load rating capacity of these jacks

Mile Road Bridge



- Single Span prestressed concrete adjacent box beams on abutments on piles
- Span: 45'
- Roadway 24 f/f guardrail
- Built 1963
- Bridge to be replaced in 2017

Mile Road Bridge

Bridge Condition in 2015



Mile Road Bridge

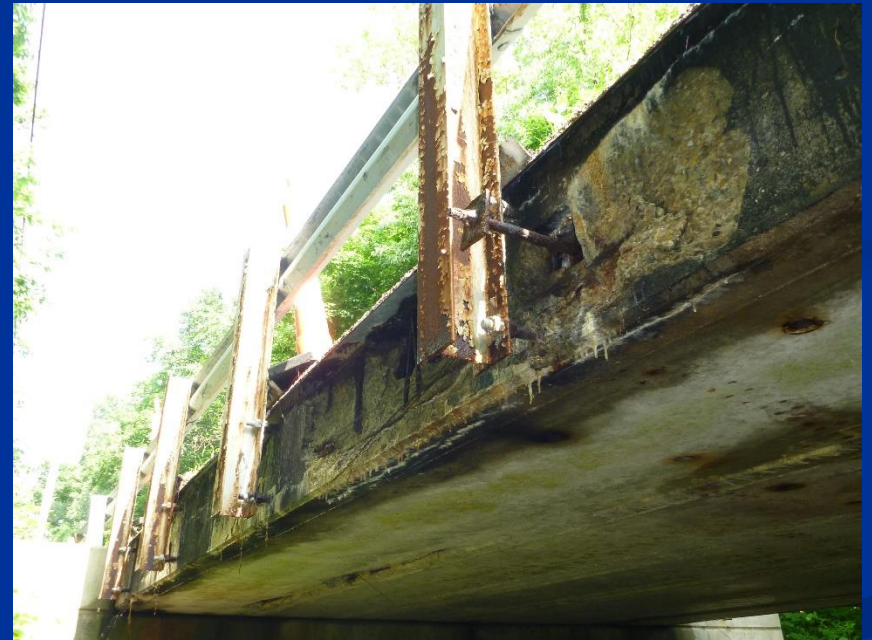
Bridge Condition in 2015



Mile Road Bridge

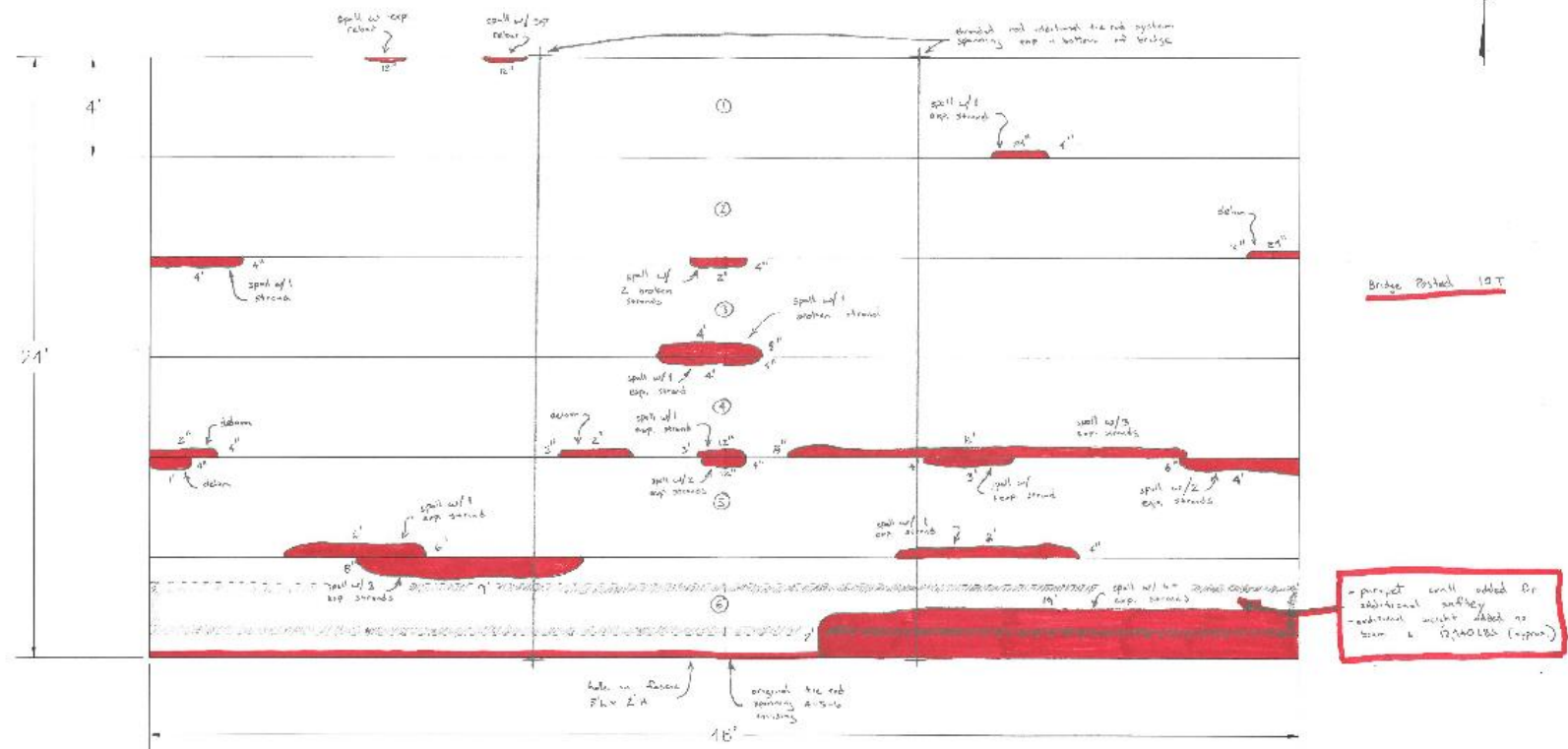
Bridge Condition in 2015

Broken Tie Rod Found



Mile Road Bridge

Mile Road JEF-10140-1.81
over Bear Creek
5740363 12/17/2015
2" = 1'

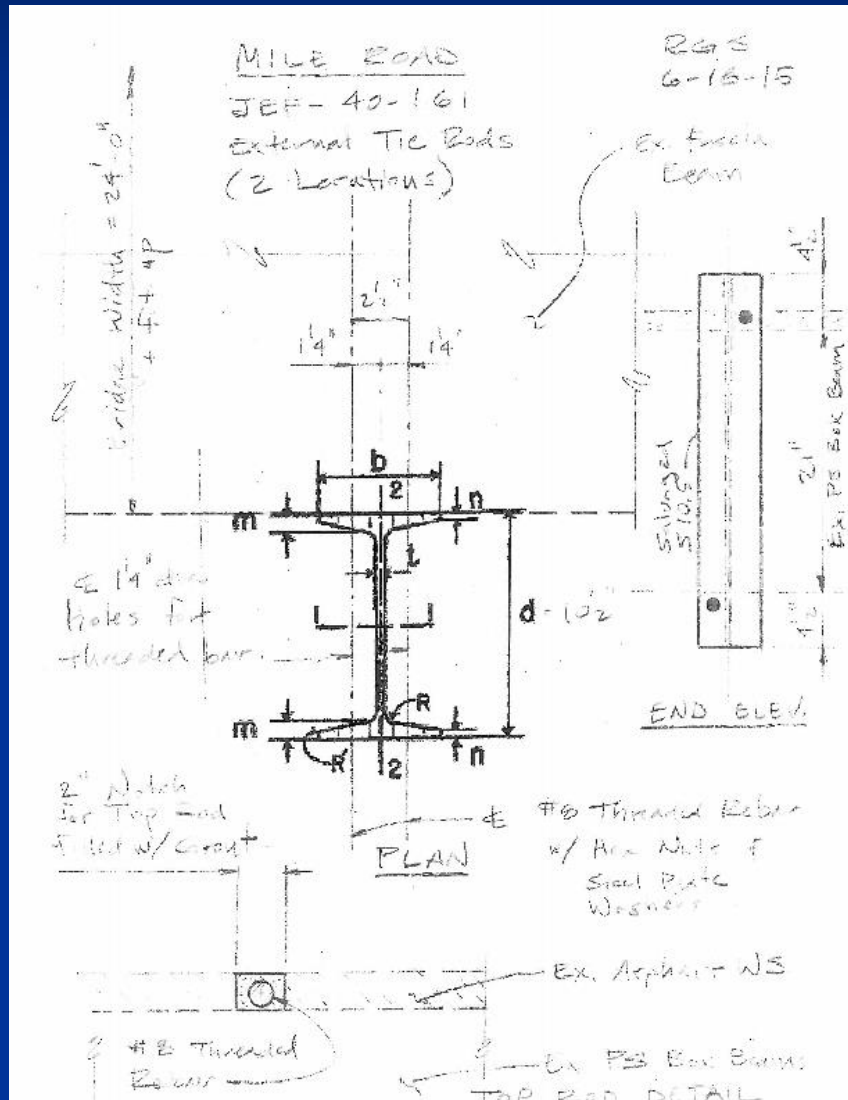


Mile Road Bridge

- Bridge closed due to emergency and temporary bridge repair completed



Mile Road Bridge



- Used #8 all-thread rods with couplers
- Used 2 1/2" rough sawed oak boards
- Used guardrail posts
- Two rods on top of beam
- Two rods on the bottom of the beam

Mile Road Bridge

Asphalt sawcut to top of beams for system installation



Mile Road Bridge

System installed



Mile Road Bridge

Used guardrail posts



Mile Road Bridge

System installed on top and bottom of beams



Mile Road Bridge

System installed on top and bottom of beams



Mile Road Bridge

System installed on top and bottom of beams



Mile Road

Asphalt and AC sealed



Chicken Bristle Culvert

Replacement of Structure



- Replacement of structure using a rotary wrecker
 - 60 ton rotator wrecker truck
 - Rent less than \$1000
 - Wreckers typically available same day vs scheduling a crane weeks out; can reschedule easy for weather
 - Setup of 15 minutes; used outriggers on plates
 - Able to set the section in less than half hour
- Manholes section weight approx. 32,000 lbs; 12' in diameter

Chicken Bristle Culvert

Replacement of Structure



Chicken Bristle Culvert

Replacement of Structure



Chicken Bristle Culvert

Replacement of Structure

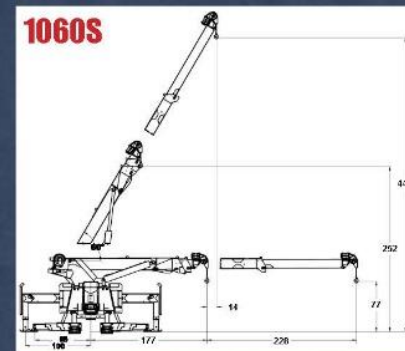
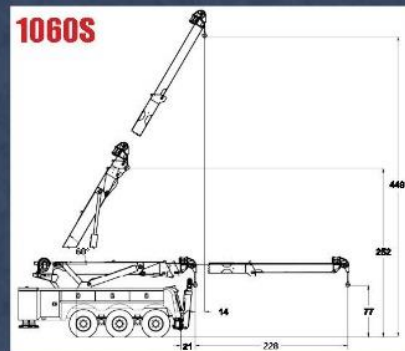
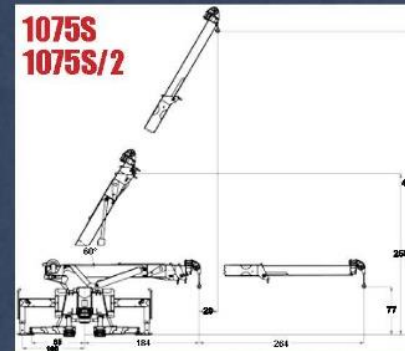
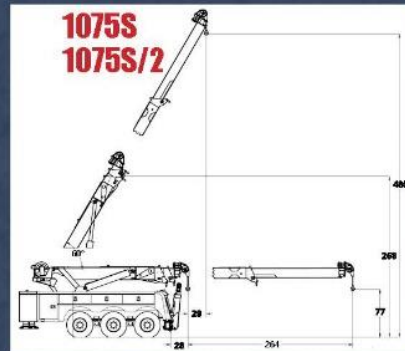


Chicken Bristle Culvert

Replacement of Structure



Chicken Bristle Culvert



BOOM SPECIFICATIONS

Boom Specifications	Boom Structural Rating (S.A.E.)		Maximum Angle	Maximum Hook Height	Reach Past Tailboard at Minimum Boom Angle
	Retracted 30°	Extended 30°			
1040S 2-Stage	80,000 lbs.	25,000 lbs.	55°	352'	156'
1050S 3-Stage	120,000 lbs.	34,000 lbs.	60°	449'	269'
1075S 3-Stage	150,000 lbs.	36,000 lbs.	60°	480'	292'
1075S/2 3-Stage	150,000 lbs.	36,000 lbs.	60°	465'	292'

WINCH SPECIFICATIONS

Winch Specifications	Winch Capacity	Winch Type	Cable Specs. 6x37 L.W.R.C.	Air Cable Tensioners
1040S	(2) 35,000 lbs.	Planetary 2-Speed	3/4" x 200'	Standard
1050S	(2) 50,000 lbs.	Planetary 2-Speed	3/4" x 250'	Standard
1075S/2	(2) 50,000 lbs.	Planetary 2-Speed	3/4" x 250'	Standard
1075S	(2) 60,000 lbs.	Planetary 2-Speed	7/8" x 250'	Standard

DRAG WINCH SPECIFICATIONS

Winch Capacity	Winch Type	Cable Specs. 6x37 L.W.R.C.	Cable Tensioners
35,000 lbs.	Planetary 2-Speed	5/8" x 200'	Air
50,000 lbs.	Planetary 2-Speed	3/4" x 250'	Air
Deal 55,000 lbs.	Planetary 2-Speed	5/8" x 250'	Air
Turret Mounted Deal 30,000 lbs.	Planetary	3/16" x 222' or 5/8" x 200'	Spring

Dayton Farmersville



- Three Span prestressed concrete adjacent box beams on abutments on piles
- Span: 61'6"-61'6"-43'
- Roadway 30 f/f guardrail
- Built 2002
- Determined steel hit when inserting dowel rod for box beams

Dayton Farmersville

Bearing seat being lost



Dayton Farmersville

- Used hydraulic jacks to bring beam up and bottle jacks are for safety caution
- Used beams off of King Richard that we tore out and blocks are guardrail spacer blocks screwed together
- Pocket welded so the system pivots



Dayton Farmersville



Dayton Farmersville



Dayton Farmersville



Chambersburg Bridge



- Single Span prestressed concrete adjacent box beams on abutments on piles
- Span: 30'
- Roadway 28'
- Built 1963
- Bridge replaced in 2016

Chambersburg Bridge

Condition of Exterior Beams in 2014



Chambersburg Bridge

Condition of Exterior Beams in 2014



Chambersburg Bridge

Hole found in top



Beams from underside



Chambersburg Bridge

Hole investigated



Dual chamber box beams



Chambersburg Bridge

Investigated top of beams



Chambersburg Bridge

Plated and monitored until replaced in 2016



Chambersburg Bridge

Monitoring 2016



Chambersburg Bridge

Monitoring 2016



Chambersburg Bridge

Replaced June 2016

