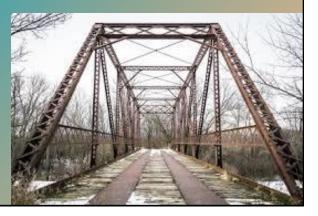


Special Projects Engineer?

- Bridge Scour Evaluation and Mitigation
- Manage Overhead Structure Inspection Program
- Manual Writing and Upkeep
- Transportation Asset Management Plan (TAMP)
- Bridge Life Cycle Cost Analysis and Planning
- Over legal Permitting

ITD Over-legal Permitting Journey

Since we built bridge to 1990's - check heavy trucks over trouble bridges.



ITD Over-legal Permitting Journey

1990's to 2021 - DMV screens by factor to determine which permits need bridge analysis. Bridge office puts bridge speed and lane restrictions on permit based on BrR analysis. Process 50-70 permits a week, 300-400 bridges analyzed. Bridge hours 60-80 a week



ITD Over-legal Permitting Journey

Starting August 4 2021- All over-legal permits analyzed on every bridge on route. Truckers can create routes, and enter truck configurations. The full bridge analysis and self issue permits takes about 5 minutes.

First 6 months weekly average

- 270 permits
- 23,000 bridges analyzed
- Bridge hours 20-30 hours

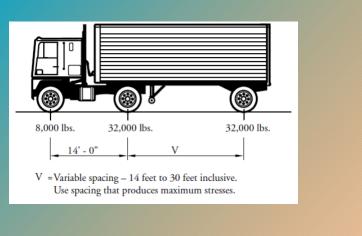


Types of Loads

- Legal Loads
- Divisible Over Legal Loads Annual Permits
- Indivisible Over Legal Loads Single Trip Permits

Bridge Design Loads

• HL-93











Routing or Rating

Pennsylvania



Idaho



Routing or Rating

Pennsylvania



<image>

Routing or Rating

Pennsylvania



Idaho



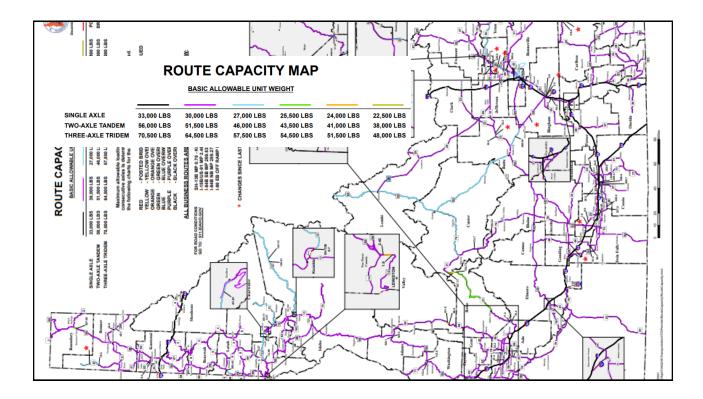
What type of permitting does your Agency need?

Rule Based

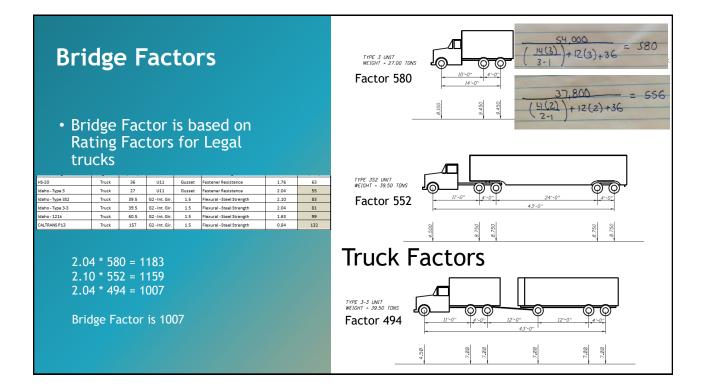
- Faster
- Conservative
- Set it and forget it

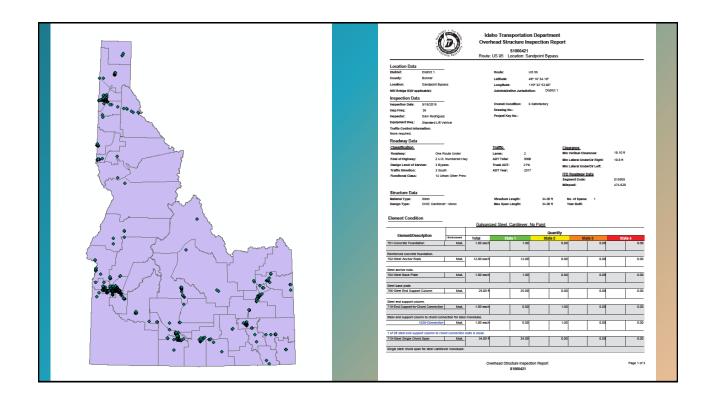
Analysis Based

- Slower
- More effort on data
- Can get trucks over with less restrictions



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Know Your Inventory

- Bridges not Load Rated in AASHTOWare BrR
 - Tables
 - Rules
 - Excel sheets
 - Engineering Judgement (no plans)
- Bridges Load Rated in AASHTOWare BrR
 - Load Rating Tool
 - LFD Member Alternative
 - LRFR
 - Check out to run

Tables, Rules, Excel, EngineeringJudgement

Truck Length (ft)	VW _{none} (kips)	VW _{Smph} (kips)	VW _{OnlySmphCL} (kips)
100	250	250	250
110	250	250	250
120	250	250	272
130	250	250	294
140	250	250	317
150	250	250	340
160	250	250	362
170	250	260	385
180	250	275	408
190	254	291	430
200	267	306	453
210	281	321	475
220	294	337	498
230	307	352	500
240	321	367	500
250	334	382	500

Weight (kips)	Requirement
225 to <250	Slow to 45 mph
250 to <275	Slow to 5 mph
275 to <325	Slow to 5 mph Only vehicle on the bridge in the direction of travel (centered in travelway)
325 to <400	Slow to 5 mph Only vehicle on the bridge in the direction of travel (centered in travelway) Trailer axles must be a minimum of 16 feet wide
400 to <600	Slow to 5 mph Only vehicle on the bridge in the direction of travel (centered in travelway) Only one lane of traffic allowed in the opposing direction Trailer axies must be a minimum of 16 feet wide

18770 Requirement Factor Normal Travel < 659 45mph < 700 25mph < 783 5mph < 785 < 1009 ov OV 5 mph < 1359 >= 1359 Manual

AASHTOWare BrR

- Load Rating Tool
- LFD Member Alternative
- LRFR
- Check Out To Run
- 3D FEM

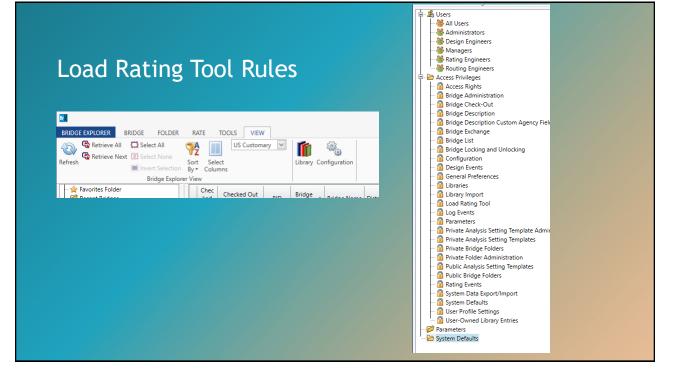
History of Load Rating Tool

AASHTOWare BrR

- Gold standard for Load Rating
- Too slow for permitting ratings take 5+ minutes for each bridge
- -

Load Rating Tool

- Uses pre-processed influence lines to quickly determine rating 100 ratings / second
- Began upgrade to BrR 10 years ago
- First included in 6.8.2 with limited capabilities
- 7.2 released last week includes LRFR



				re analysis Specific	tations S	ubstructure and	lysis Tolerance	Custom agency fie	lds Rating tool
oad r	rating tool	reposito	ory: Browse						
	-								
\\ITD	HQ1FSP08	3\AssetN	fanagement\Load Rat	ting\LR ITD\BrR Prec \	D305AE19-0	435-4585-BE4D	-7622AFAFBE99-7.	0.0.3001	
Pr	rocessing order	Code	Description	Pass condition	% impact (%)	One lane restriction			
▶ 1		1	ок		100.00				
2		2	45 mph	45 mph	69.20				
3		2	25 mph	25 mph	38.50				
4		4	5 mph	5 mph	0.00				
5		5	single lane	single lane	100.00	V			
6		6	single lane, 45 mph	single lane, 45 mph	69.20	\checkmark			
7		7	single lane, 25 mph	single lane, 25 mph	38.50				
		8	single lane, 5 mph	single lane, 5 mph	0.00	1			

Managing Data	Y	LFD
	Y	LFD
	Y	LFD
orkspace • • Sche	Y	LFD
· · · · · · · · · · · · · · · · · · ·	Y	LFD
ge Components	Y	LFD
A 10000 → Ø Components	Y	LFD
 Diaphragm Definitions 	Y	LFD
2 Lateral Bracing Definitions	Y	LFD
MPE L DETD. Multiple Desense Factors	Y	LFD
	Y	LFD
Description Description (cont'd) Alternatives Global reference point Traffic Custom agency fields	Y	LFD
	Y	LFD
Field Value	Y	LFD
Special	Y	LFD
Permit	N	LRFR
DeckTy ConcreteComp Engine A	γ	LFD
FastAct	γ	LFD
LoadRa Y	γ	LFD
PermitT LFD	Y	LFD
EIGHT	Y	LFD
NINE	N	LFD MA, Check out to
TEN	Y	LFD
	v	LFD
	Y	LFU

Br.										AASHTOWare Bridge	e Desigr
BRIDGE EXPLORER BRIDGE FOLDER RATE	TOOLS VIEW	N									
New CheckOut Authorization - Check In Open Detection	- OIO	Paste Cop		Delete	ock	Check	In				
Bridge		Manage			Protect	ion					
🥟 Recent Bridges 🛛 👘 k	ec Checked Out ed By	BID	Bridge 🔺	-						Feature Intersected	Mile/K (n
🗭 All			10660	08610A 14.75						Yale Road:Raft River	
🖻 🎾 Completely Defined			10665	08610A 14.8 08610A 18.93						COUNTY ROAD GS	
😥 I 15			10675							Lanes Gulch	
😥 1 84		2221		08610A 20.78							
👰 1 86			10680	08610A 22.44						Fall Creek	
😥 I 90			10685	08610A 22.45						Fall Creek	
🖉 SH 200			10690	S08610A 23.82						Little Warm Creek	
🕅 SH 28			10695	08610A 025.3						Dairy Canyon;Fronta	
		265	10700	08610A 25.35	05	77 Powe	1 86 WB	13.2 W. A	00086	Dairy Canyon;Fronta	
		267	10705	08610A 26.46	05	77 Powe	1 86 EBL	12.1 W. A	00086	ROCK CR;MASSACR	
🕅 US 12		1059	10710	08610A 26.47	05	77 Powe	I-86 WE	12.1 W. A	00086	Rock Cr;Massacre Ro	
🔐 US 20		1423	10740	S08610A 32.4	05	77 Powe	186 & F	6.0 W. An	00086	Little Creek	
🕅 US 26		5784	10750	08610A 034	05	77 Powe	I-86 EBI	4.6 W. An	00086	Warm Creek Road G	
🕡 US 30		5785	10755	08610A 034.0	05	77 Powe	I-86 WE	4.6 W. An	00086	Warm Creek Road G	
👰 US 91		3169	10765	08610A 38.58	05	77 Powe	1 86 EBL	AT AMER	00086	SUNBEAM ROAD GS	
👰 US 93		3170	10770	08610A 38.59	05	77 Powe	I 86 WB	AT AMER	00086	SUNBEAM ROAD GS	
👰 US 95		6244	10775	08610A 39.28	05	77 Powe	186 EBL	NEAR AM	00086	PRIVATE RD:MACHIN	
Not Completely Defined			10780	08610A 39.29						PRIVATE RD:MACHIN	
📁 Deleted Bridges			10700	006104 41 22						Keen Bel CS	

ckOut ization • Bridge	Batch - Find Co	py Patte Copy Ner To* Fro Manage	over Delete		Check In													
es Folder	Che	Manage	-	Protect	son		1.1	1	1		las 1					10	1	1
Bridges Bges	che cke d Out	By BID Bridge ID	Bridge Name	District	County	Facility	Location	Route	Feature Intersected		Ow int ner ain er	Length (ft)	Year Built	Special Directions	PermitNotes	DeckType	Engine	LoadRating Tool
mpletely Defined		5914 21285	97113A 1.86	03	01 Ada	SMA 7113	In Boise: Curtis R	o 07113	I 1848; Curtis Road	1.86	Stati State 52 PSG	203.000	1968			ConcreteComposite	A	Y
Ada County		5916 26036	X993010 100.15	03	01 Ada	BROOKSID	2.0 N. 1.8 E. EAG	LE 00000	DRY CREEK	0.15	Cou Cour 51 PSS	25.000	1994			NoDeck	A	Y
115		5917 26091	98963A 10.53	03	01 Ada	SMA 8963	2.0 S. 1.9 E. Meri	di 08963	Ridenbaugh Canal	0.53	Cou Cour 51 PSS	38.000	2011			ConcreteNonComposite	A	Y
184		5939 21506	97363A 1.67	03	01 Ada	STP7363; /	IN BOISE; AMERI	C 07363	BOISE RIVER	1.67	Cou Cou 52 PSG	313.000	1994			ConcreteComposite	A	Y
190		5940 25813	99803A 18.24	03	01 Ada	SMA9803;	In Boise	09803	Settlers Canal	8.24	Cou Cour 51 PSS	67.000	2007			ConcreteComposite	A	Y
LRT		5941 25818	99803A 15.68	03	01 Ada	SMA9803;	In Boise; Maple (51 09803	Finch Lateral	5.68	Cou Cou 51 PSS	24.000	2008			NoDeck	A	Y
SH 200		5943 33405	X993010 100.09	03	01 Ada	S. Findley	In Boise	00000	New York Canal	0.09	Cou Cour 54 PST	111.000	1998			ConcreteComposite	A	Y
SH 28		5960 21655	97183A 1	03	01 Ada	NHS 7183;	In Boise; S. 9th S	tr 07183	Boise River	1.00	Cou Cou 45 SCMB	311.000	1987			ConcreteComposite	A	Y
5H 33		5961 25816	99803A 15.59	03	01 Ada	SMA9803;	In Boise; Maple (Ge 09803	Ridenbaugh Canal	5.59	Cou Cou 55 PSMB	30.000	2008			NoDeck	A	Y
5H 55		5970 26348	97113A 1.74	03	01 Ada	SMA 7113			SETTLERS CANAL	1.74	Cou Cour 52 PSG	71.000	2000			ConcreteComposite	A	Y
US 12 US 20		5985 26071	97073A 13.51	03	01 Ada				NEW YORK CANAL	3.52	Cou Cour 52 PSG	106.000	2005			ConcreteComposite	A	Y
US 26		5988 26008	X993010 13.16	03	01 Ada	Lake Haze			New York Canal		Cou Cou 54 PST	119.000	2018			NoDeck	A	¥
JS 30		6018 19750	93770A 9.94	03	01 Ada	STC 3770;5			Boise River(Star Bridge)		Cou Cou 52 PSG	378.000	1982			ConcreteComposite	A	Y
JS 91		6224 19825	93784A 2.09	03	01 Ada		E 3.4 E. KUNA		New York Canal		Cou Cou 54 PST	120.000	1977			ConcreteComposite	A	Y
JS 93		6257 25993	X993010 0.13	03	01 Ada				TEN MILE CREEK		Cou Cour 55 PSMB	63.000	2019			NoDeck	A	Y
US 95		6301 25855	99733A 2.46		01 Ada				Ridenbaugh Canal		Cou Cou 55 PSMB	43.000	1989			ConcreteNonComposite	A	٧
Completely Defined		6303 26171	97028A 107.97	03	01 Ada				DRY CREEK CANAL		Cou Cou 55 PSMB	60.000	1991			NoDeck	A	Y
i Bridges		6314 25745	X993010 0.10	03	01 Ada				Ridenbaugh Canal		Cou Cour 54 PST	34.000	1981			ConcreteComposite	A	Y
		6372 25985	993010 1.84	03	01 Ada				I 1848 E-W;EMERALD ST GS		Stati Stati 52 PSG	291.000	1968			ConcreteComposite	A	Y
		6396 25911	97673A 0.45	03	01 Ada		On Gowen Rd; E				Cou Cou 52 PSG	112.000	2020			ConcreteComposite	A	Y
		6405 15786	080708 63.53	03	01 Ada		9.2 E. Boise ECL		KUNA RD;BLACKS CREEK RD		Stati Stati 52 PSG	114.000	2020			ConcreteComposite	A	Y
		6407 15781	080708 62.3	03	01 Ada		9.2 E. Boise ECL		KUNA RD; BLACKS CREEK RD		Stati Stati 52 PSG	114.000	2020			ConcreteComposite	A	Y
		6484 21661	97563A 6.09	03	01 Ada	OVERLANI			I 84:COLE/OVERLAND LC		Stati Stati 62 PSCG	216.000	1996			ConcreteComposite	A	Y
		6597 21191	97013A 7.98	03	01 Ada		3.0 E. Meridian		Ridenbaugh Canal		Cou Cour 17 RCF	30.000	1992			CulvertModule	A	Y
		6600 26047	X993010 0.40	03	01 Ada		0.8 E. 1.2 N. of K				Cou Coui 17 RCF	21.000	2020			CulvertModule	A	Y
		6601 19776	99183A 12.97	03	01 Ada		1.7 N. 2.0 W. Me				Cou Cou 17 RCF	25.000	2020			CulvertModule	A 4	Y V
		6605 25785		03	01 Ada		1.2 S. 4.0 E. KUN				Cou Cou 54 PST	94.000	1978			ConcreteComposite		
		6743 12800	97643A 3.77	03	01 Ada				NEW YORK CANAL		Cou Coui 14 RCT	114.000	1964			ConcreteMono CulvertModule	A	Y
		6748 15790	S080708 63.95		01 Ada		9.6 E. BOISE ECL		BLACKS CREEK		Stati Stati 17 RCF	20.000					A	Y V
		6749 15795		03	01 Ada		9.6 E. BOISE ECL				Stati Stati 17 RCF	20.000	1963 1993			CulvertModule CulvertModule	A	Y V
		6797 19761 6798 21670		03	01 Ada 01 Ada				RIDENBAUGH CANAL		Cou Cou 17 RCF Cou Cou 21 RCCS	34.000	1993			NoDeck	A	Y Y
		6/98 216/0 6811 19796_mjh			01 Ada 01 Ada				NEW YORK CANAL Boise River N. Channel		Cou Cou 21 RCCS Cou Cou 52 PSG	431.000	1989			NoDeck ConcreteComposite	A	Y
		6911 21725_mjh			01 Ada 01 Ada				UPRR: Gowen Road Br		Cou Cou 14 RCT	431.000	1992			concretecomposite	A	Y V
		6927 21325_mjh			01 Ada 01 Ada				UPKK; Gowen Road Br		State State 24 RCCT	152.000	1941				A 4	Y Y
		6949 12815	021108 17.16		01 Ada		17 N. Boise		Mores Cr; Lucky Peak Res		Stati Stati 24 RCC1 Stati Stati 49 SCT	848.000		Charlout-P	Run Laura for for	b ConcreteNonComposite	A A	v
		6992 15810 LAG		03	01 Ada		15.9 E. Boise ECL				Stati Stati 14 RCT	26.000	1955	CHECKOUTION	num carsa for su	ConcreteMono	A .	Y
		6993 15805_LAG			01 Ada		15.9 E. Boise ECL				Stati Stati 14 RCT	26.000	1960			ConcreteMono	A	Y
		0995 13005_DAG	000100 10.23	00	VI MOB	1 04 EDL	TAR C DOISE EUL	00084	Includer Creek	0.25	view plate in null	20.000	1925			Concretemono	A	- N

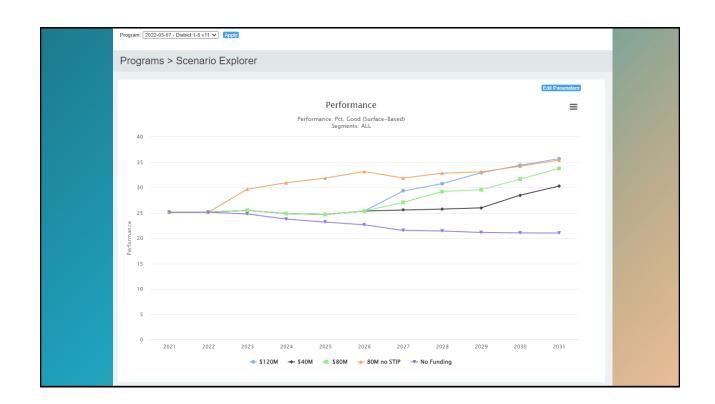
nit application number:													
			_										
			\sim										
quested by:													
nimum allowable rating factor:	1.0												
mment:													
	_												
Bridges Vehicles Rating resu	ts												
ilter results: 🗸 Pass 🗸 Fail 🗸	Evention												
interresults. V Pass V Tall V	exceptions	·											
Vehicle	Rating level	BID	Bridge ID	Route	Code	Description	Inventory rating factor	Operating rating factor	Controlling impact	Pass conditions	Analysis warnings		
240k Test Truck (Do not dele	Oper	1740	15790_o	1	1	ОК	0.759	1.267	1.000				
240k Test Truck (Do not dele	Oper		15795_0		1	OK	0.803	1.342	1.000			-	
	Oper		26220	00000	1	ОК	1.645	2.748	1.000				
240k Test Truck (Do not dele			33435	00000	1	OK	1.330	2.221	1.000				
240k Test Truck (Do not dele	Oper		26261	00000	1	ОК	1.119	1.873	1.000				
	Oper	1917	26280	00055	1	ОК	0.734	1.604	1.000				
240k Test Truck (Do not dele	Oper	1930	21600	07433		Denied	0.575	0.959	1.000				
240k Test Truck (Do not dele	Oper	1930	21600	07433	2	45 mph	0.619	1.032	0.692	45 mph			
240k Test Truck (Do not dele	Oper	2061	33415	07023		Denied	0.502	0.839	1.000				
240k Test Truck (Do not dele	Oper	2061	33415	07023		Denied	0.541	0.903	0.692				
240k Test Truck (Do not dele	Oper	2061	33415	07023		Denied	0.585	0.978	0.385				
240k Test Truck (Do not dele	Oper	2061	33415	07023	4	5 mph	0.653	1.091	0.000	5 mph			
240k Test Truck (Do not dele	Oper	2063	34015	00016	1	ОК	0.709	1.296	1.000				
240k Test Truck (Do not dele	Oper	2125	21451	07553	1	ОК	7.058	11.786	1.000				
240k Test Truck (Do not dele	Oper	2130	25866	00000	1	ОК	1.325	2.212	1.000				
240k Test Truck (Do not dele	Oper	2168	25876	00000	1	ОК	1.339	2.237	1.000				
240k Test Truck (Do not dele	Oper	2172	25836	09273	1	OK	1.408	2.351	1.000			-	
240k fest fruck (Do not dele	Oper	2175	34020	00016	1	ОК	0.882	1.472	1.000				
240k Test Truck (Do not dele 240k Test Truck (Do not dele							0.040	2,612	1 000				

Managing Load Rating Tool Files / Data

- We review Load Rating Tool files monthly
 - Create for new structures
 - Update for changed structures
 - Delete for structures no longer in inventory

	010			puted data		Bridge database					
	BID	naulas in	NIDI ID	D	Commented by	Bridge ID	NBI structure ID	Date last modified	Last modified by	Select	
					ler	18670	00000000018	2/7/2018	Tisha Hyde		
GE EXPLORER BRIDGE FOLD	R R	ATE TO	DOLS VIEW		ler	18675	00000000018	2/25/2019	Anthony Beauc		
					ler	18735	00000000018	7/13/2017	Tisha Hyde		
2 I I I			II	1 🚓	ler	12930	00000000012	9/4/2017	Tisha Hyde		
Update BrM Rating Recent Rating				nputed Load Rat		12920	00000000012	2/26/2019	Anthony Beauc		
Ratings Results Results		vents		ata Tool	ler	12925	00000000012	1/17/2017	Tisha Hyde		
Rate Resu	lts		Routing	Rating Tool	ler	17690	00000000017	7/6/2017	Tisha Hyde		
👉 Favorites Folder		Chec			ler	18300	00000000018	4/15/2019	Tyler Haney		
Posont Pridaos		charb	Checked Out	RIN Bridge	Jake ^p cielgler	26678	00000000026	2/4/2018	Tisha Hyde		
	11	29586	00000000029		Jake Legler	29586	00000000029	2/4/2018	Tisha Hyde		
	11	31258	00000000031	1/19/2021	Jake Legler	31258	00000000031	7/7/2017	Tisha Hyde		
	11	10396	00000000010	1/19/2021	Jake Legler	10396	00000000010	2/10/2018	Tisha Hyde		
	11	13485	00000000013	1/19/2021	Jake Legler	13485	00000000013	3/3/2021	Tyler Haney	V	
	11	11050	000000011050	1/19/2021	Jake Legler	11050	000000011050	3/29/2019	Anthony Beauc		
	11	11055	00000011055	1/19/2021	Jake Legler	11055	000000011055	3/29/2019	Anthony Beauc		
	11	11160	000000011160	1/19/2021	Jake Legler	11160	000000011160	6/16/2017	Tisha Hyde		
	11	11185	00000000011	1/19/2021	Jake Legler	11185	00000000011	2/25/2019	Anthony Beauc		
	11	11190	00000000011	1/19/2021	Jake Legler	11190	00000000011	6/25/2017	Tisha Hyde		
	11	15680	00000000015	1/19/2021	Jake Legler	15680	00000000015	2/26/2019	Anthony Beauc		
	11	15805	00000000015	1/19/2021	Jake Legler	15805	00000000015	3/9/2018	Tyler Haney		
	11	16520	00000000016	1/19/2021	Jake Legler	16520	00000000016	1/31/2014	Tisha Hyde		
	11	16525	00000000016	1/19/2021	Jake Legler	16525	00000000016	1/31/2014	Tisha Hyde		
	11	16865	00000000016	1/19/2021	Jake Legler	16865	00000000016	2/10/2018	Tisha Hyde		
	11	16870	00000000016	1/19/2021	Jake Legler	16870	00000000016	2/10/2018	Tisha Hyde		
	11	16920	00000000016	1/19/2021	Jake Legler	16920	00000000016	2/10/2018	Tisha Hyde		
	11	16925	00000000016	1/19/2021	lake Legler	16925	000000000016	2/10/2018	Tisha Hyde		
	Sel	ect All	Select Outdated	Select Not Foun	d Clear Sele	ected L	pdate Selected	Delete Selected			





Other Considerations

- Max weight (other) for self issuance
- Max weight (other) to go through system
- Non Standard Gauge Vehicles

Data Updates

- ITD updates bridge and load rating information quarterly
 - Backup of BrR database
 - Zip file of Load Rating Tool files
 - Spreadsheet with inventory information
- Able to make emergency changes via 511 restrictions system
- Can update bridge models and inventory information in between but testing is cumbersome

Data Testing

- 1) 121k Test Run the 121k Truck over all State bridges through system. Match rating method and Operating Rating result.
- 2) 240k Test Run the 240k Truck over all State bridges through system. Match speed and lane requirements
- 3) Side by Side Run permits manually and make sure they match bridges on route, ratings, and requirements.

Data Testing

- Initial system setup 121k Test, 240k Test, Side by Side
- Data updates 121k Test, 240k Test
- Ongoing QA Side by Side

System Monitoring

- Real Time monitoring for error bridges. Bridge where results are expected but system returns none.
- Monitoring of Failed and Manual results for bridges that are causing problems

