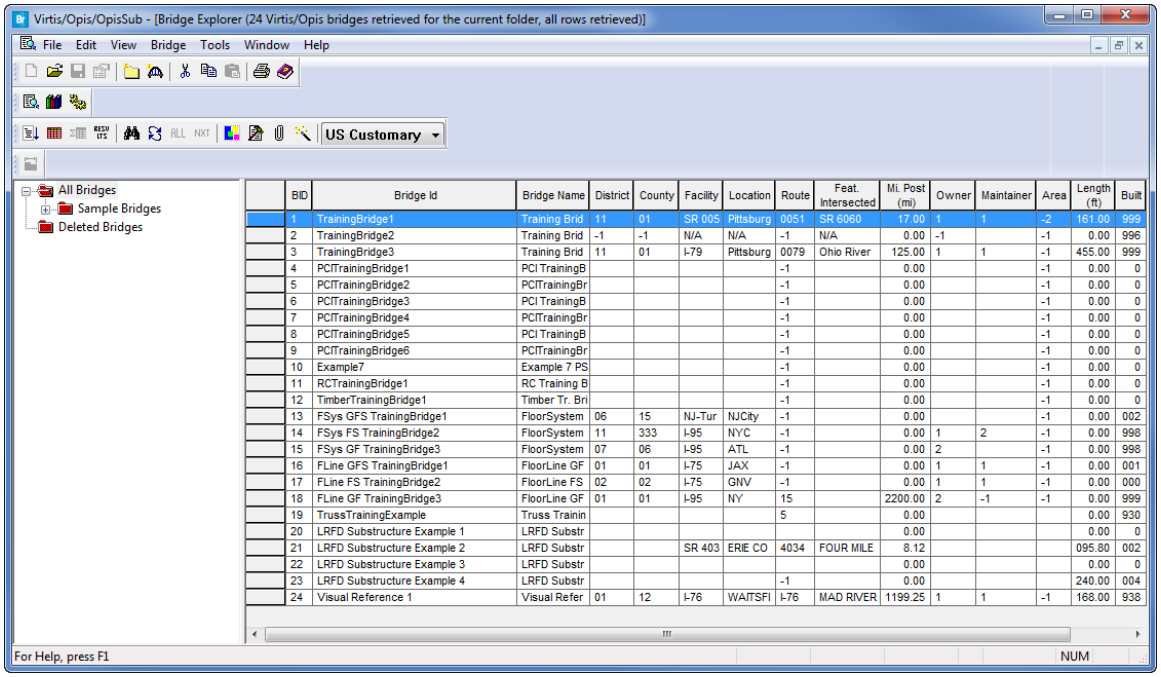
AASHTOWare Bridge Rating and Design Training - (BrR/BrD 6.4)

Fatigue and Service Stress LRFD/LRFR Reports

Topics Covered

- Fatigue and Service stress reports for LRFD/LRFR

Note: *Fatigue and Service Stress reports can be generated for Steel Girders LRFD/LRFR analysis only.*



	BID	Bridge Id	Bridge Name	District	County	Facility	Location	Route	Feat. Intersected	Mi. Post (mi)	Owner	Maintainer	Area	Length (ft)	Built
	1	TrainingBridge1	Training Brid	11	01	SR 005	Pittsburg	0051	SR 6060	17.00	1	1	-2	161.00	999
	2	TrainingBridge2	Training Brid	-1	-1	N/A	N/A	-1	N/A	0.00	-1		-1	0.00	996
	3	TrainingBridge3	Training Brid	11	01	I-79	Pittsburg	0079	Ohio River	125.00	1	1	-1	455.00	999
	4	PCITrainingBridge1	PCI TrainingB					-1		0.00			-1	0.00	0
	5	PCITrainingBridge2	PCITrainingBr					-1		0.00			-1	0.00	0
	6	PCITrainingBridge3	PCI TrainingB					-1		0.00			-1	0.00	0
	7	PCITrainingBridge4	PCITrainingBr					-1		0.00			-1	0.00	0
	8	PCITrainingBridge5	PCI TrainingB					-1		0.00			-1	0.00	0
	9	PCITrainingBridge6	PCITrainingBr					-1		0.00			-1	0.00	0
	10	Example7	Example 7 PS					-1		0.00			-1	0.00	0
	11	RCTrainingBridge1	RC Training B					-1		0.00			-1	0.00	0
	12	TimberTrainingBridge1	Timber Tr. Bri					-1		0.00			-1	0.00	0
	13	FSys GFS TrainingBridge1	FloorSystem	06	15	NJ-Tur	NJCity	-1		0.00			-1	0.00	002
	14	FSys FS TrainingBridge2	FloorSystem	11	333	I-95	NYC	-1		0.00	1	2	-1	0.00	998
	15	FSys GF TrainingBridge3	FloorSystem	07	06	I-95	ATL	-1		0.00	2		-1	0.00	998
	16	FLine GFS TrainingBridge1	FloorLine GF	01	01	I-75	JAX	-1		0.00	1	1	-1	0.00	001
	17	FLine FS TrainingBridge2	FloorLine FS	02	02	I-75	GNV	-1		0.00	1	1	-1	0.00	000
	18	FLine GF TrainingBridge3	FloorLine GF	01	01	I-95	NY	15		2200.00	2	-1	-1	0.00	999
	19	TrussTrainingExample	Truss Trainin					5		0.00				0.00	930
	20	LRFD Substructure Example 1	LRFD Substr							0.00				0.00	0
	21	LRFD Substructure Example 2	LRFD Substr			SR 403	ERIE CO	4034	FOUR MILE	8.12				095.80	002
	22	LRFD Substructure Example 3	LRFD Substr							0.00				0.00	0
	23	LRFD Substructure Example 4	LRFD Substr					-1		0.00				240.00	004
	24	Visual Reference 1	Visual Refer	01	12	I-76	WAITSFI	I-76	MAD RIVER	1199.25	1	1	-1	168.00	938

Fig 1. Bridge Explorer

From the Bridge Explorer (Fig 1) select TrainingBridge1 (BID 1) and double click (or right click and select open) to open it.

Once Bridge Workspace tree shows up, expand “Simple Span Structure” under “SUPERSTRUCTURE DEFINITIONS” in the tree by clicking on “+” . Then expand “MEMBERS” and select “G1”. Expand “G1” and select “Plate Girder (E)(C)” under “MEMBER ALTERNATIVES”. Expand “Plate Girder (E)(C)” by clicking on “+”. Now Bridge Workspace tree will be as shown in Fig 2.

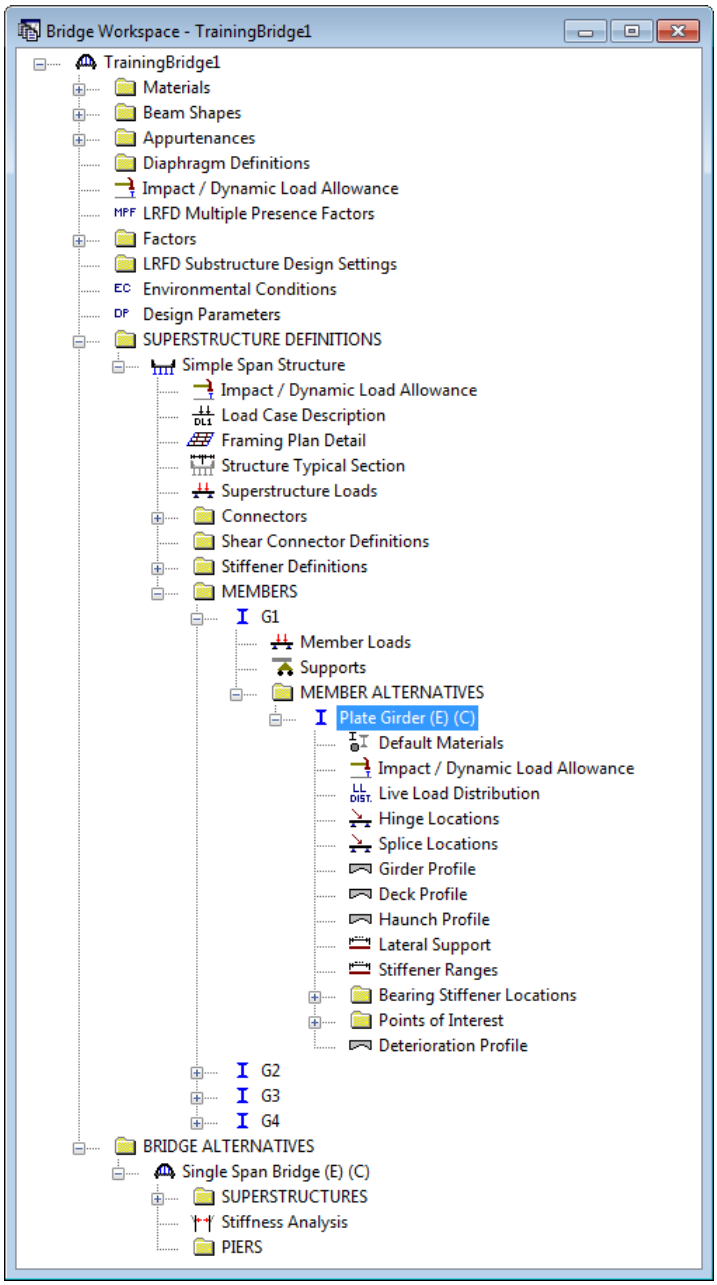


Fig 2. G1 - Bridge Workspace Tree - Girder Member Alternative

Select member alternative “Plate Girder (E) (C)”. Go to toolbar and click on View Analysis Setting button (Fig 3) to open Analysis Settings window (Fig 4).

Fig 3. View Analysis Setting Button

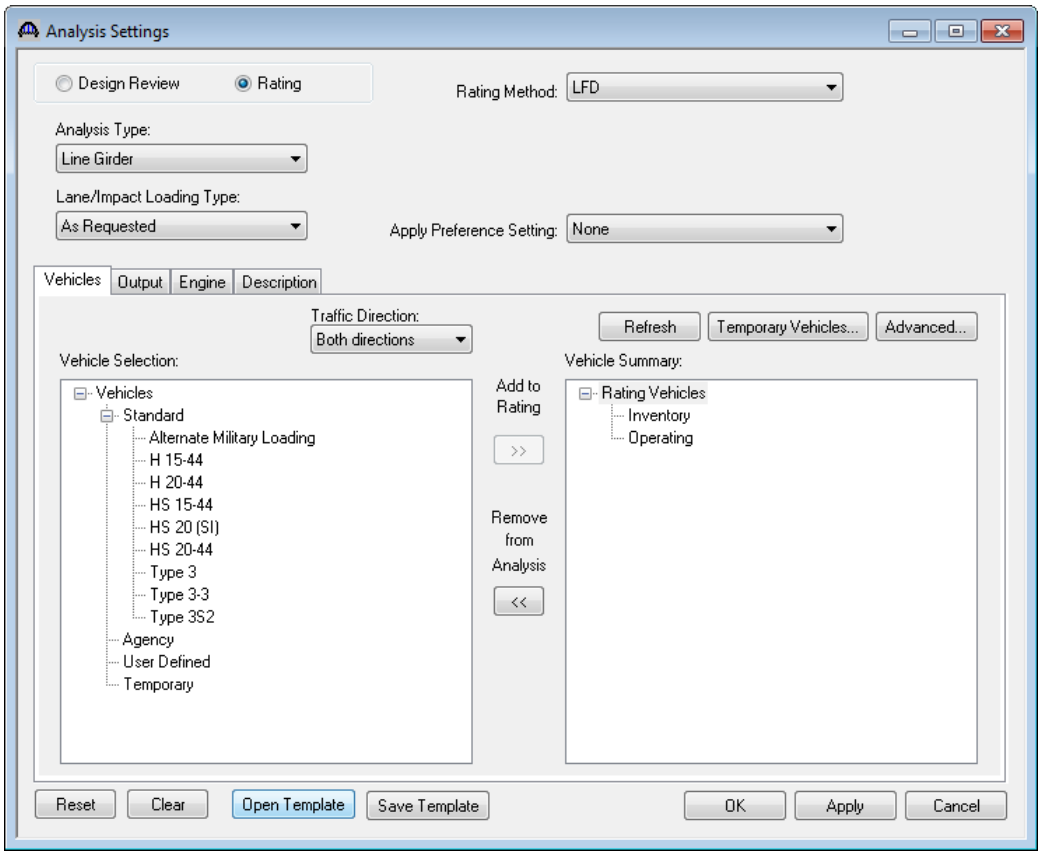


Fig 4. Analysis Settings Window

On analysis setting window click on "Open Template" button to open Template library (Fig 5). Select "HL93 Design Review" Template from Template Library. Click on "Open" button to apply template to Analysis Settings window (Fig 6).

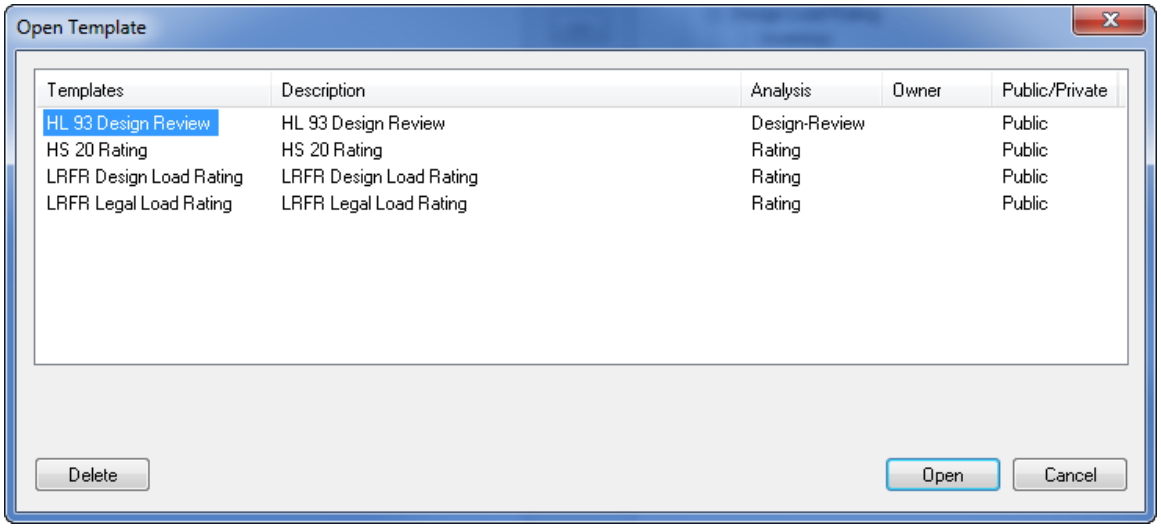


Fig 5. Open Template Window

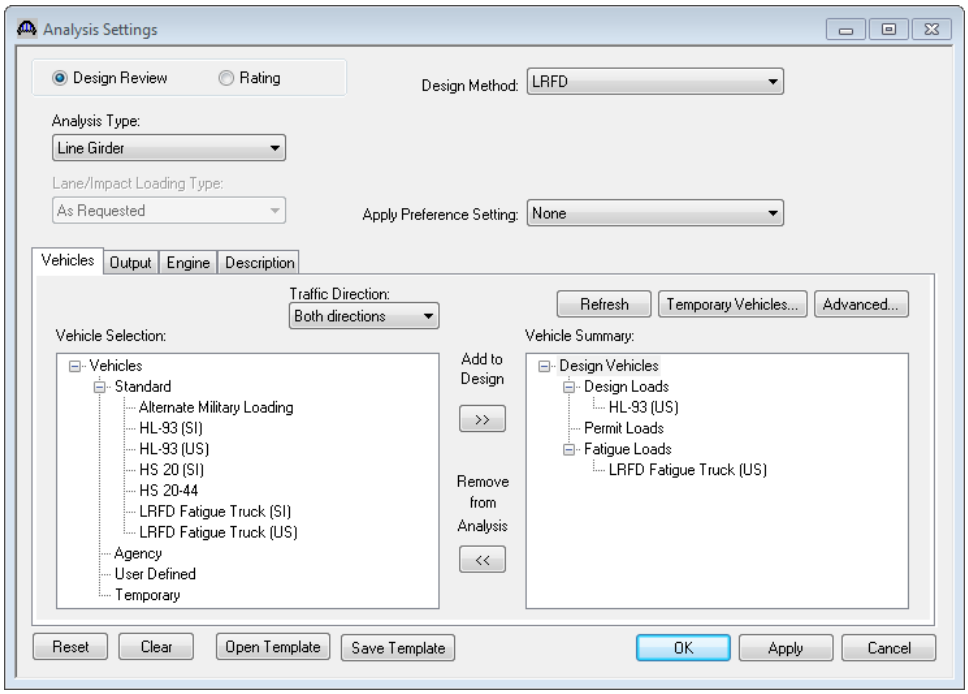


Fig 6. Analysis Settings Window – With Design Vehicles

Open Output tab on Analysis Settings window (Fig 7). Select Fatigue Stress Ranges report and Service II Stresses Ranges report by checking in check box under AASHTO Engines Reports. Click on "OK" button to save and close Analysis Settings window.

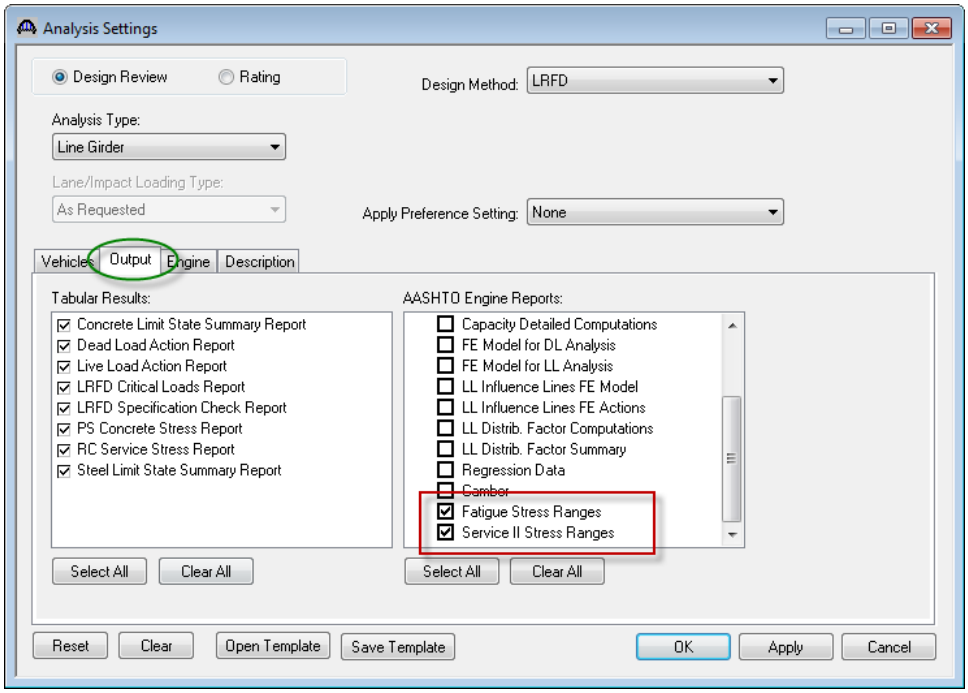


Fig 7. Analysis Settings Window – Output Tab

Fig 8. Analyze Button

Select member alternative “Plate Girder (E)(C)” on G1. Click on Analyze Button on toolbar (Fig 8) to run analysis. Once Analyze button is clicked Analysis Progress window pops up (Fig 9). After analysis is completed click on “OK” button to close Analysis Progress window.

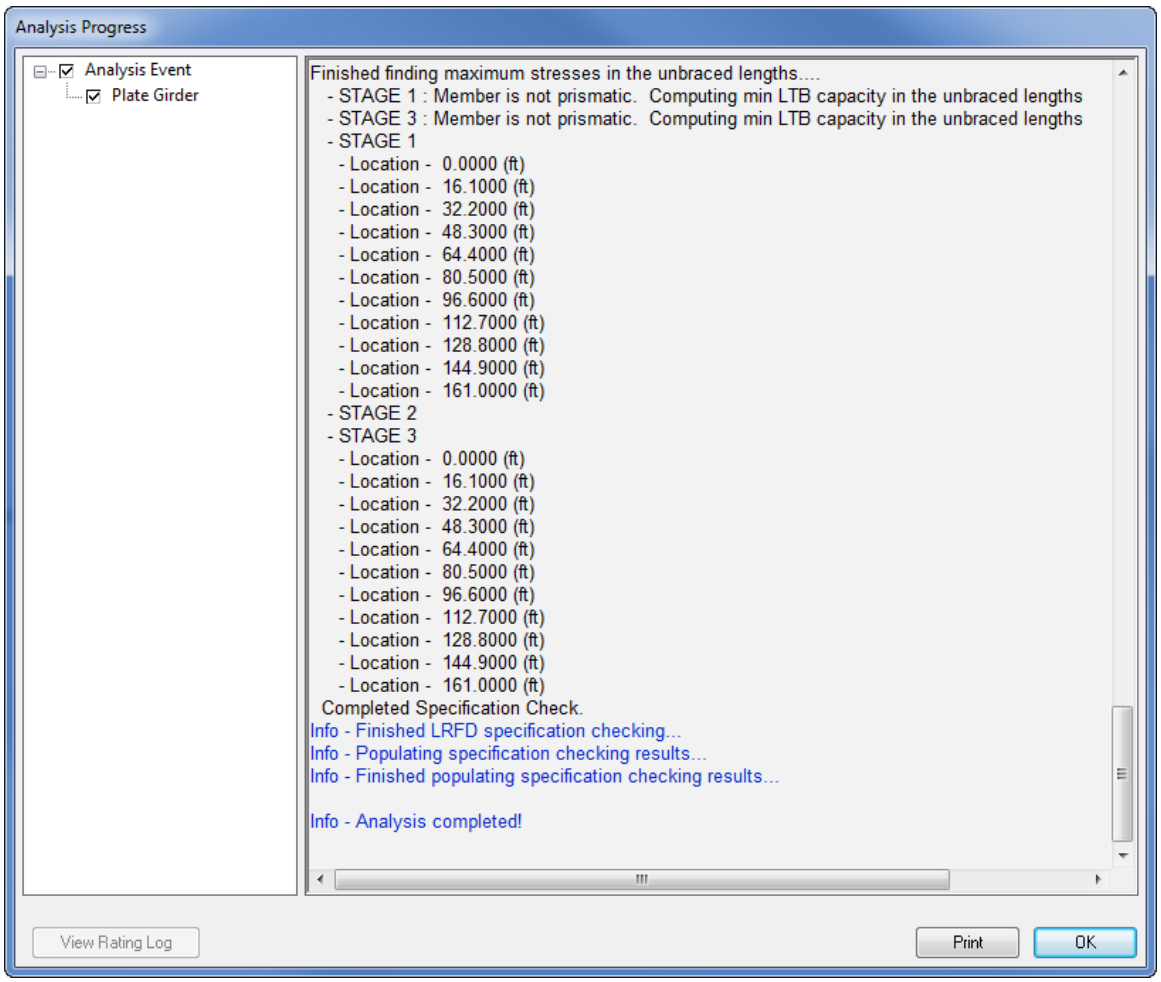


Fig 9. Analysis Progress Window

Click View Analysis Output button (Fig. 10) on toolbar to open Analysis Output List window (Fig 11).

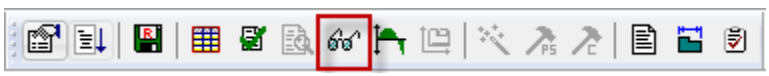


Fig 10. View Analysis Output Button

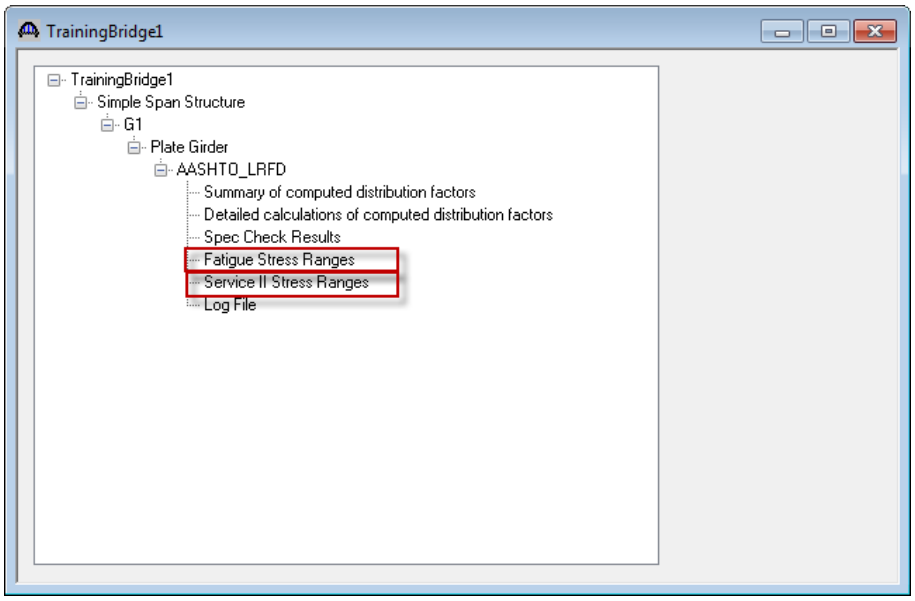
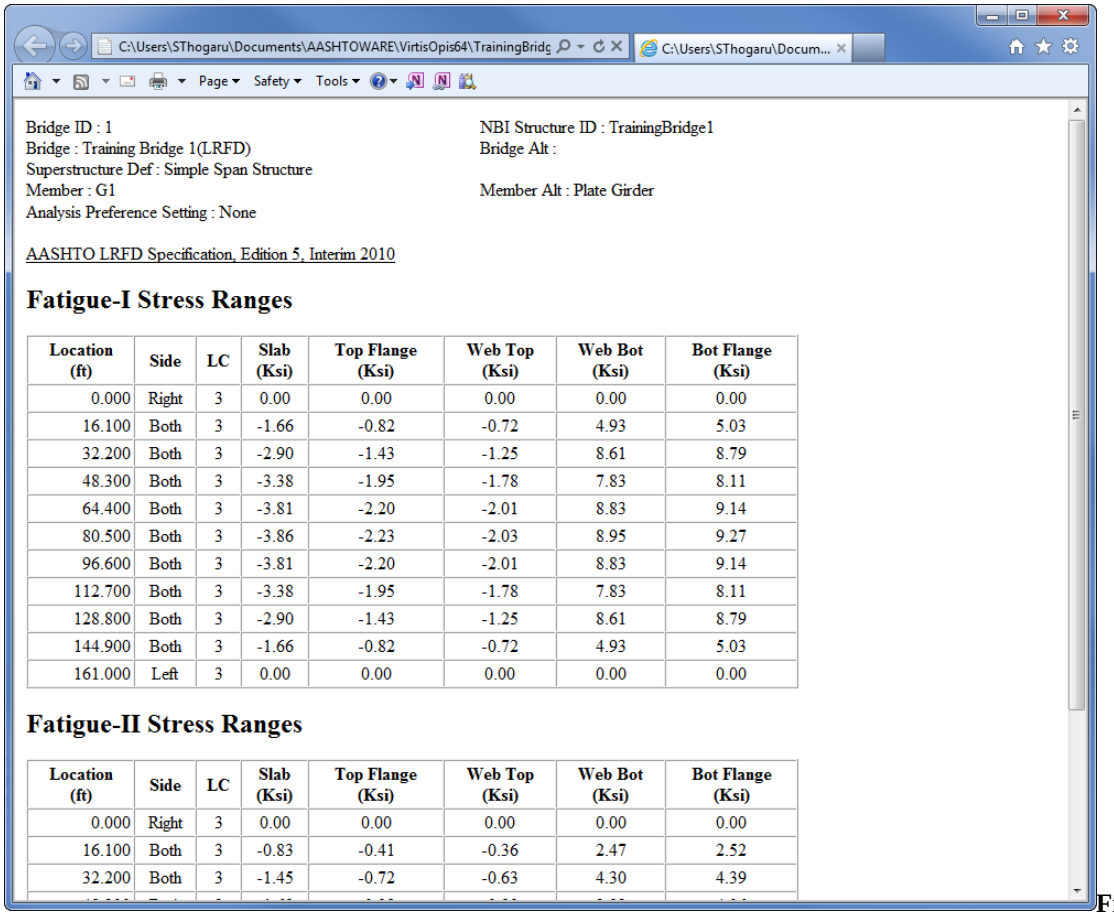


Fig 11. Analysis Output List Window

Double click on “Fatigue Stress Ranges” link to open LRFD Fatigue Stress Report (Fig 12)



Bridge ID : 1
Bridge : Training Bridge 1(LRFD)
Superstructure Def : Simple Span Structure
Member : G1
Analysis Preference Setting : None

NBI Structure ID : TrainingBridge1
Bridge Alt :

Member Alt : Plate Girder

AASHTO LRFD Specification, Edition 5, Interim 2010

Fatigue-I Stress Ranges

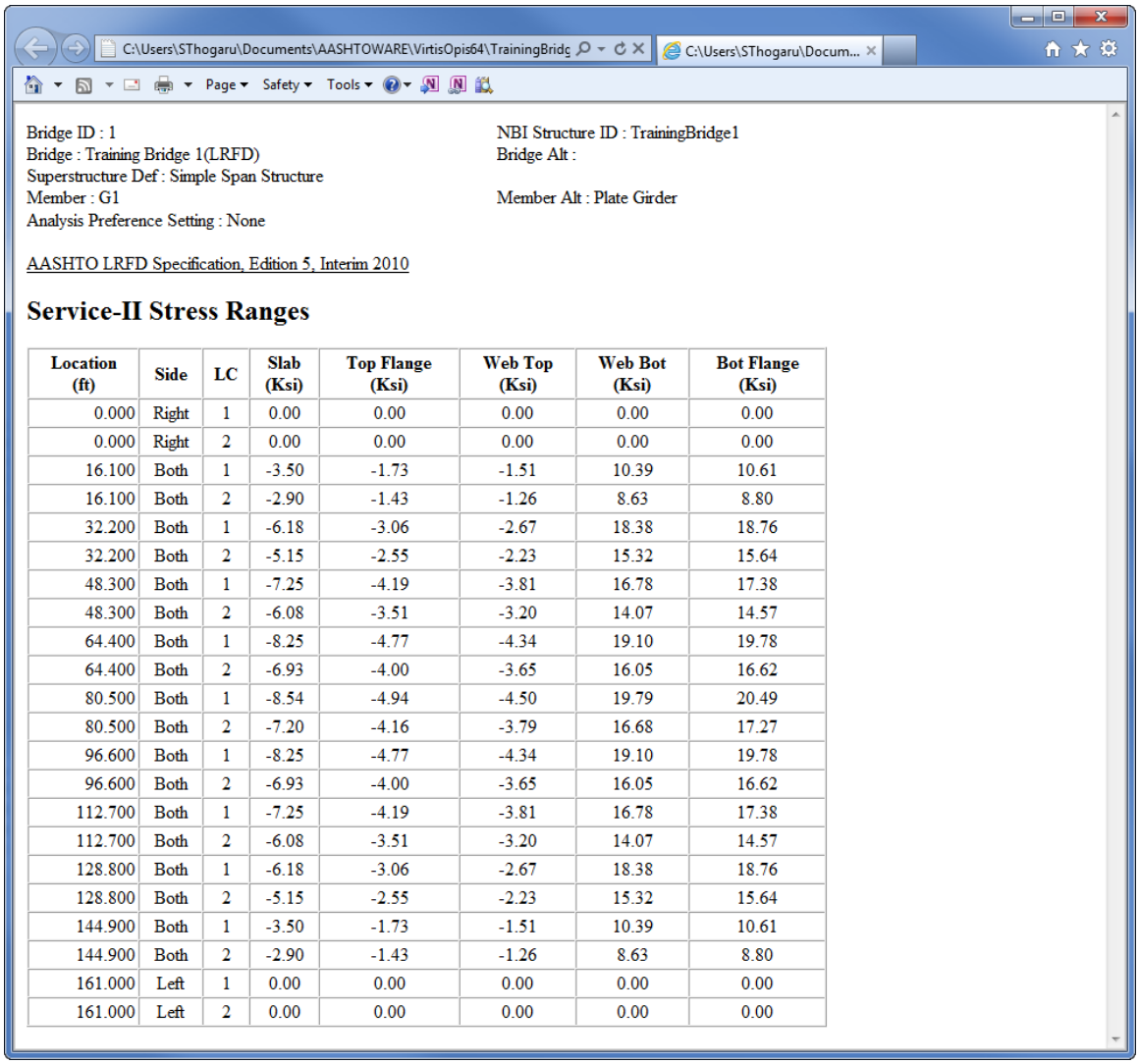
Location (ft)	Side	LC	Slab (Ksi)	Top Flange (Ksi)	Web Top (Ksi)	Web Bot (Ksi)	Bot Flange (Ksi)
0.000	Right	3	0.00	0.00	0.00	0.00	0.00
16.100	Both	3	-1.66	-0.82	-0.72	4.93	5.03
32.200	Both	3	-2.90	-1.43	-1.25	8.61	8.79
48.300	Both	3	-3.38	-1.95	-1.78	7.83	8.11
64.400	Both	3	-3.81	-2.20	-2.01	8.83	9.14
80.500	Both	3	-3.86	-2.23	-2.03	8.95	9.27
96.600	Both	3	-3.81	-2.20	-2.01	8.83	9.14
112.700	Both	3	-3.38	-1.95	-1.78	7.83	8.11
128.800	Both	3	-2.90	-1.43	-1.25	8.61	8.79
144.900	Both	3	-1.66	-0.82	-0.72	4.93	5.03
161.000	Left	3	0.00	0.00	0.00	0.00	0.00

Fatigue-II Stress Ranges

Location (ft)	Side	LC	Slab (Ksi)	Top Flange (Ksi)	Web Top (Ksi)	Web Bot (Ksi)	Bot Flange (Ksi)
0.000	Right	3	0.00	0.00	0.00	0.00	0.00
16.100	Both	3	-0.83	-0.41	-0.36	2.47	2.52
32.200	Both	3	-1.45	-0.72	-0.63	4.30	4.39

Fig 12. LRFR Fatigue Stress Report

Double click on “Service II Stress Ranges” link to open LRFD Service II Stress Report (Fig 13).



Bridge ID : 1
Bridge : Training Bridge 1(LRFD)
Superstructure Def : Simple Span Structure
Member : G1
Analysis Preference Setting : None

NBI Structure ID : TrainingBridge1
Bridge Alt :

Member Alt : Plate Girder

AASHTO LRFD Specification, Edition 5, Interim 2010

Service-II Stress Ranges

Location (ft)	Side	LC	Slab (Ksi)	Top Flange (Ksi)	Web Top (Ksi)	Web Bot (Ksi)	Bot Flange (Ksi)
0.000	Right	1	0.00	0.00	0.00	0.00	0.00
0.000	Right	2	0.00	0.00	0.00	0.00	0.00
16.100	Both	1	-3.50	-1.73	-1.51	10.39	10.61
16.100	Both	2	-2.90	-1.43	-1.26	8.63	8.80
32.200	Both	1	-6.18	-3.06	-2.67	18.38	18.76
32.200	Both	2	-5.15	-2.55	-2.23	15.32	15.64
48.300	Both	1	-7.25	-4.19	-3.81	16.78	17.38
48.300	Both	2	-6.08	-3.51	-3.20	14.07	14.57
64.400	Both	1	-8.25	-4.77	-4.34	19.10	19.78
64.400	Both	2	-6.93	-4.00	-3.65	16.05	16.62
80.500	Both	1	-8.54	-4.94	-4.50	19.79	20.49
80.500	Both	2	-7.20	-4.16	-3.79	16.68	17.27
96.600	Both	1	-8.25	-4.77	-4.34	19.10	19.78
96.600	Both	2	-6.93	-4.00	-3.65	16.05	16.62
112.700	Both	1	-7.25	-4.19	-3.81	16.78	17.38
112.700	Both	2	-6.08	-3.51	-3.20	14.07	14.57
128.800	Both	1	-6.18	-3.06	-2.67	18.38	18.76
128.800	Both	2	-5.15	-2.55	-2.23	15.32	15.64
144.900	Both	1	-3.50	-1.73	-1.51	10.39	10.61
144.900	Both	2	-2.90	-1.43	-1.26	8.63	8.80
161.000	Left	1	0.00	0.00	0.00	0.00	0.00
161.000	Left	2	0.00	0.00	0.00	0.00	0.00

Fig 13. LRFR Service II Stress Report

Fatigue and Service stress reports can also be generated for LRFR analysis using similar procedure.