

# Steel Bridge Resiliency

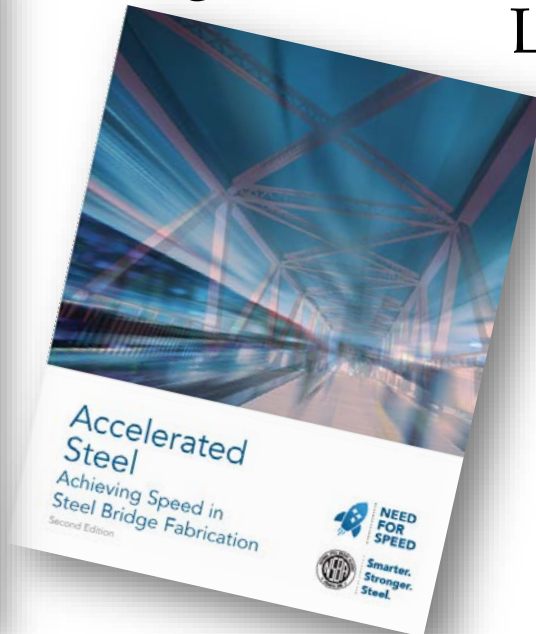
*Rapid Steel Solutions for Bridge Emergencies*

12 February 2026

New Jersey Short Span Steel  
Bridge Workshop

Ronnie Medlock, PE

High Steel Structures, LLC,  
Lancaster PA





# What is rapid?



# What is typical?





*Nine to twelve months*



*Two to three years*







*Shop Planning*



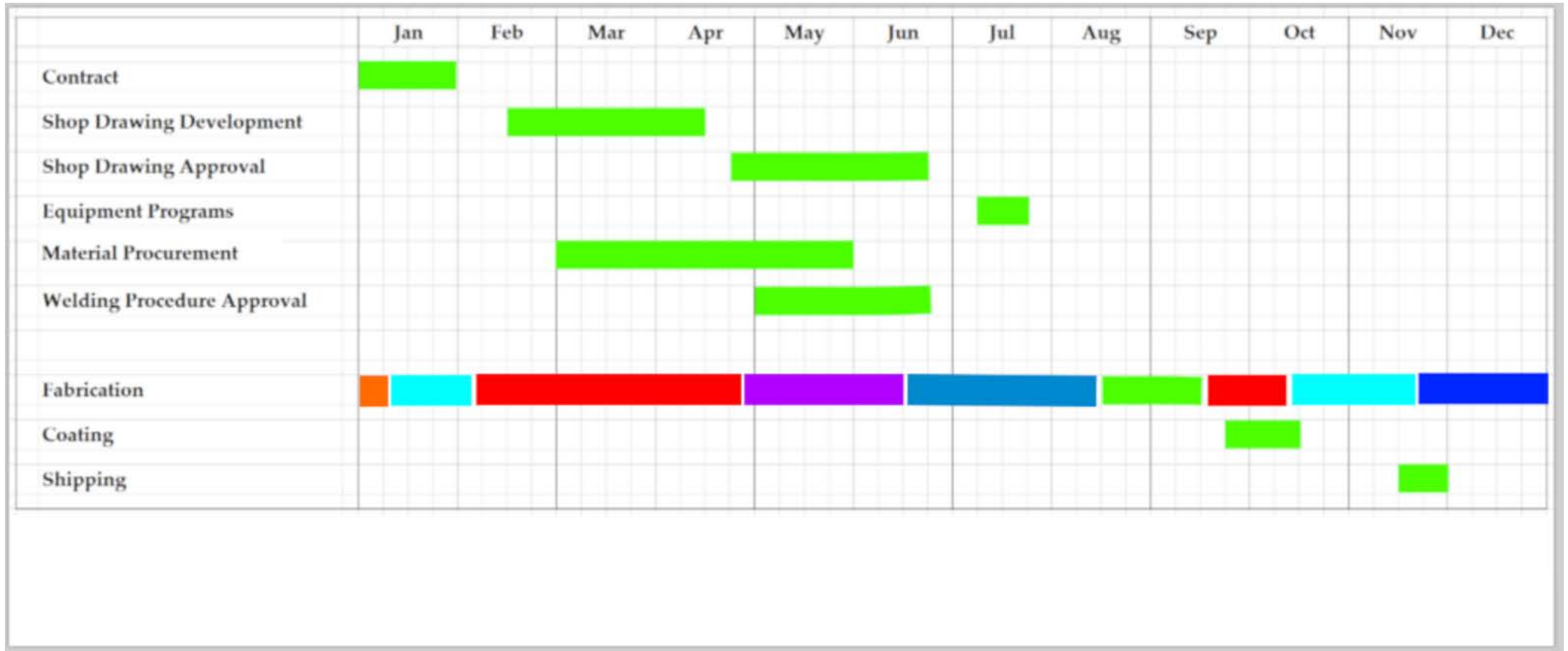
Welding Procedure for Prequalified Joint:  
**WP73PA08**

Material Specification				ASTM A709 Grade 50, 50W			
Manual, Semi-automatic or Machine				Machine			
Filler Metal Specification				AWS A5.23			
Shielding Gas				Single Arc			
Electrode				Single Arc			
Shielding Gas				Single Arc			
Required Preheat				See preheat chart below			
Polarity / Balance				AC / 83% HF @ 30Hz			
Plate Thickness	Pass #	Amps	Wire feed speed	Volts	Travel speed (IPM)	Position	Revision
1/2"	1/A	730-760	18-23	31.2-33.8	18-23	10	Original Issue
3/4"	1/A	760-790	18-23	31.2-33.8	18-23	10	11/2/2017
1"	1/A	790-820	18-23	31.2-33.8	18-23	10	5/2/2009
1 1/8"	1/A	820-850	18-23	31.2-33.8	18-23	10	5/2/2009
1 1/2"	1/A	850-880	18-23	31.2-33.8	18-23	10	5/2/2009
1 3/4"	1/A	880-910	18-23	31.2-33.8	18-23	10	5/2/2009
2"	1/A	910-940	18-23	31.2-33.8	18-23	10	5/2/2009
2 1/4"	1/A	940-970	18-23	31.2-33.8	18-23	10	5/2/2009
2 3/4"	1/A	970-1000	18-23	31.2-33.8	18-23	10	5/2/2009
3"	1/A	1000-1030	18-23	31.2-33.8	18-23	10	5/2/2009
3 1/2"	1/A	1030-1060	18-23	31.2-33.8	18-23	10	5/2/2009
4"	1/A	1060-1090	18-23	31.2-33.8	18-23	10	5/2/2009
4 1/2"	1/A	1090-1120	18-23	31.2-33.8	18-23	10	5/2/2009
5"	1/A	1120-1150	18-23	31.2-33.8	18-23	10	5/2/2009
5 1/2"	1/A	1150-1180	18-23	31.2-33.8	18-23	10	5/2/2009
6"	1/A	1180-1210	18-23	31.2-33.8	18-23	10	5/2/2009
6 1/2"	1/A	1210-1240	18-23	31.2-33.8	18-23	10	5/2/2009
7"	1/A	1240-1270	18-23	31.2-33.8	18-23	10	5/2/2009
7 1/2"	1/A	1270-1300	18-23	31.2-33.8	18-23	10	5/2/2009
8"	1/A	1300-1330	18-23	31.2-33.8	18-23	10	5/2/2009
8 1/2"	1/A	1330-1360	18-23	31.2-33.8	18-23	10	5/2/2009
9"	1/A	1360-1390	18-23	31.2-33.8	18-23	10	5/2/2009
9 1/2"	1/A	1390-1420	18-23	31.2-33.8	18-23	10	5/2/2009
10"	1/A	1420-1450	18-23	31.2-33.8	18-23	10	5/2/2009
10 1/2"	1/A	1450-1480	18-23	31.2-33.8	18-23	10	5/2/2009
11"	1/A	1480-1510	18-23	31.2-33.8	18-23	10	5/2/2009
11 1/2"	1/A	1510-1540	18-23	31.2-33.8	18-23	10	5/2/2009
12"	1/A	1540-1570	18-23	31.2-33.8	18-23	10	5/2/2009
12 1/2"	1/A	1570-1600	18-23	31.2-33.8	18-23	10	5/2/2009
13"	1/A	1600-1630	18-23	31.2-33.8	18-23	10	5/2/2009
13 1/2"	1/A	1630-1660	18-23	31.2-33.8	18-23	10	5/2/2009
14"	1/A	1660-1690	18-23	31.2-33.8	18-23	10	5/2/2009
14 1/2"	1/A	1690-1720	18-23	31.2-33.8	18-23	10	5/2/2009
15"	1/A	1720-1750	18-23	31.2-33.8	18-23	10	5/2/2009
15 1/2"	1/A	1750-1780	18-23	31.2-33.8	18-23	10	5/2/2009
16"	1/A	1780-1810	18-23	31.2-33.8	18-23	10	5/2/2009
16 1/2"	1/A	1810-1840	18-23	31.2-33.8	18-23	10	5/2/2009
17"	1/A	1840-1870	18-23	31.2-33.8	18-23	10	5/2/2009
17 1/2"	1/A	1870-1900	18-23	31.2-33.8	18-23	10	5/2/2009
18"	1/A	1900-1930	18-23	31.2-33.8	18-23	10	5/2/2009
18 1/2"	1/A	1930-1960	18-23	31.2-33.8	18-23	10	5/2/2009
19"	1/A	1960-1990	18-23	31.2-33.8	18-23	10	5/2/2009
19 1/2"	1/A	1990-2020	18-23	31.2-33.8	18-23	10	5/2/2009
20"	1/A	2020-2050	18-23	31.2-33.8	18-23	10	5/2/2009
20 1/2"	1/A	2050-2080	18-23	31.2-33.8	18-23	10	5/2/2009
21"	1/A	2080-2110	18-23	31.2-33.8	18-23	10	5/2/2009
21 1/2"	1/A	2110-2140	18-23	31.2-33.8	18-23	10	5/2/2009
22"	1/A	2140-2170	18-23	31.2-33.8	18-23	10	5/2/2009
22 1/2"	1/A	2170-2200	18-23	31.2-33.8	18-23	10	5/2/2009
23"	1/A	2200-2230	18-23	31.2-33.8	18-23	10	5/2/2009
23 1/2"	1/A	2230-2260	18-23	31.2-33.8	18-23	10	5/2/2009
24"	1/A	2260-2290	18-23	31.2-33.8	18-23	10	5/2/2009
24 1/2"	1/A	2290-2320	18-23	31.2-33.8	18-23	10	5/2/2009
25"	1/A	2320-2350	18-23	31.2-33.8	18-23	10	5/2/2009
25 1/2"	1/A	2350-2380	18-23	31.2-33.8	18-23	10	5/2/2009
26"	1/A	2380-2410	18-23	31.2-33.8	18-23	10	5/2/2009
26 1/2"	1/A	2410-2440	18-23	31.2-33.8	18-23	10	5/2/2009
27"	1/A	2440-2470	18-23	31.2-33.8	18-23	10	5/2/2009
27 1/2"	1/A	2470-2500	18-23	31.2-33.8	18-23	10	5/2/2009
28"	1/A	2500-2530	18-23	31.2-33.8	18-23	10	5/2/2009
28 1/2"	1/A	2530-2560	18-23	31.2-33.8	18-23	10	5/2/2009
29"	1/A	2560-2590	18-23	31.2-33.8	18-23	10	5/2/2009
29 1/2"	1/A	2590-2620	18-23	31.2-33.8	18-23	10	5/2/2009
30"	1/A	2620-2650	18-23	31.2-33.8	18-23	10	5/2/2009
30 1/2"	1/A	2650-2680	18-23	31.2-33.8	18-23	10	5/2/2009
31"	1/A	2680-2710	18-23	31.2-33.8	18-23	10	5/2/2009
31 1/2"	1/A	2710-2740	18-23	31.2-33.8	18-23	10	5/2/2009
32"	1/A	2740-2770	18-23	31.2-33.8	18-23	10	5/2/2009
32 1/2"	1/A	2770-2800	18-23	31.2-33.8	18-23	10	5/2/2009
33"	1/A	2800-2830	18-23	31.2-33.8	18-23	10	5/2/2009
33 1/2"	1/A	2830-2860	18-23	31.2-33.8	18-23	10	5/2/2009
34"	1/A	2860-2890	18-23	31.2-33.8	18-23	10	5/2/2009
34 1/2"	1/A	2890-2920	18-23	31.2-33.8	18-23	10	5/2/2009
35"	1/A	2920-2950	18-23	31.2-33.8	18-23	10	5/2/2009
35 1/2"	1/A	2950-2980	18-23	31.2-33.8	18-23	10	5/2/2009
36"	1/A	2980-3010	18-23	31.2-33.8	18-23	10	5/2/2009
36 1/2"	1/A	3010-3040	18-23	31.2-33.8	18-23	10	5/2/2009
37"	1/A	3040-3070	18-23	31.2-33.8	18-23	10	5/2/2009
37 1/2"	1/A	3070-3100	18-23	31.2-33.8	18-23	10	5/2/2009
38"	1/A	3100-3130	18-23	31.2-33.8	18-23	10	5/2/2009
38 1/2"	1/A	3130-3160	18-23	31.2-33.8	18-23	10	5/2/2009
39"	1/A	3160-3190	18-23	31.2-33.8	18-23	10	5/2/2009
39 1/2"	1/A	3190-3220	18-23	31.2-33.8	18-23	10	5/2/2009
40"	1/A	3220-3250	18-23	31.2-33.8	18-23	10	5/2/2009
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41"	1/A	3280-3310	18-23	31.2-33.8	18-23	10	5/2/2009
41 1/2"	1/A	3310-3340	18-23	31.2-33.8	18-23	10	5/2/2009
42"	1/A	3340-3370	18-23	31.2-33.8	18-23	10	5/2/2009
42 1/2"	1/A	3370-3400	18-23	31.2-33.8	18-23	10	5/2/2009
43"	1/A	3400-3430	18-23	31.2-33.8	18-23	10	5/2/2009
43 1/2"	1/A	3430-3460	18-23	31.2-33.8	18-23	10	5/2/2009
44"	1/A	3460-3490	18-23	31.2-33.8	18-23	10	5/2/2009
44 1/2"	1/A	3490-3520	18-23	31.2-33.8	18-23	10	5/2/2009
45"	1/A	3520-3550	18-23	31.2-33.8	18-23	10	5/2/2009
45 1/2"	1/A	3550-3580	18-23	31.2-33.8	18-23	10	5/2/2009
46"	1/A	3580-3610	18-23	31.2-33.8	18-23	10	5/2/2009
46 1/2"	1/A	3610-3640	18-23	31.2-33.8	18-23	10	5/2/2009
47"	1/A	3640-3670	18-23	31.2-33.8	18-23	10	5/2/2009
47 1/2"	1/A	3670-3700	18-23	31.2-33.8	18-23	10	5/2/2009
48"	1/A	3700-3730	18-23	31.2-33.8	18-23	10	5/2/2009
48 1/2"	1/A	3730-3760	18-23	31.2-33.8	18-23	10	5/2/2009
49"	1/A	3760-3790	18-23	31.2-33.8	18-23	10	5/2/2009
49 1/2"	1/A	3790-3820	18-23	31.2-33.8	18-23	10	5/2/2009
50"	1/A	3820-3850	18-23	31.2-33.8	18-23	10	5/2/2009
50 1/2"	1/A	3850-3880	18-23	31.2-33.8	18-23	10	5/2/2009
51"	1/A	3880-3910	18-23	31.2-33.8	18-23	10	5/2/2009
51 1/2"	1/A	3910-3940	18-23	31.2-33.8	18-23	10	5/2/2009
52"	1/A	3940-3970	18-23	31.2-33.8	18-23	10	5/2/2009
52 1/2"	1/A	3970-4000	18-23	31.2-33.8	18-23	10	5/2/2009
53"	1/A	4000-4030	18-23	31.2-33.8	18-23	10	5/2/2009
53 1/2"	1/A	4030-4060	18-23	31.2-33.8	18-23	10	5/2/2009
54"	1/A	4060-4090	18-23	31.2-33.8	18-23	10	5/2/2009
54 1/2"	1/A	4090-4120	18-23	31.2-33.8	18-23	10	5/2/2009
55"	1/A	4120-4150	18-23	31.2-33.8	18-23	10	5/2/2009
55 1/2"	1/A	4150-4180	18-23	31.2-33.8	18-23	10	5/2/2009
56"	1/A	4180-4210	18-23	31.2-33.8	18-23	10	5/2/2009
56 1/2"	1/A	4210-4240	18-23	31.2-33.8	18-23	10	5/2/2009
57"	1/A	4240-4270	18-23	31.2-33.8	18-23	10	5/2/2009
57 1/2"	1/A	4270-4300	18-23	31.2-33.8	18-23	10	5/2/2009
58"	1/A	4300-4330	18-23	31.2-33.8	18-23	10	5/2/2009
58 1/2"	1/A	4330-4360	18-23	31.2-33.8	18-23	10	5/2/2009
59"	1/A	4360-4390	18-23	31.2-33.8	18-23	10	5/2/2009
59 1/2"	1/A	4390-4420	18-23	31.2-33.8	18-23	10	5/2/2009
60"	1/A	4420-4450	18-23	31.2-33.8	18-23	10	5/2/2009
60 1/2"	1/A	4450-4480	18-23	31.2-33.8	18-23	10	5/2/2009
61"	1/A	4480-4510	18-23	31.2-33.8	18-23	10	5/2/2009
61 1/2"	1/A	4510-4540	18-23	31.2-33.8	18-23	10	5/2/2009
62"	1/A	4540-4570	18-23	31.2-33.8	18-23	10	5/2/2009
62 1/2"	1/A	4570-4600	18-23	31.2-33.8	18-23	10	5/2/2009
63"	1/A	4600-4630	18-23	31.2-33.8	18-23	10	5/2/2009
63 1/2"	1/A	4630-4660	18-23	31.2-33.8	18-23	10	5/2/2009
64"	1/A	4660-4690	18-23	31.2-33.8	18-23	10	5/2/2009
64 1/2"	1/A	4690-4720	18-23	31.2-33.8	18-23	10	5/2/2009
65"	1/A	4720-4750	18-23	31.2-33.8	18-23	10	5/2/2009
65 1/2"	1/A	4750-4780	18-23	31.2-33.8	18-23	10	5/2/2009
66"	1/A	4780-4810	18-23	31.2			

# Typical Project Schedule

## Essentials

- Approved shop drawings
- Materials
- Approved welding procedures
- Capacity







11 weeks

**Rapid Steel**



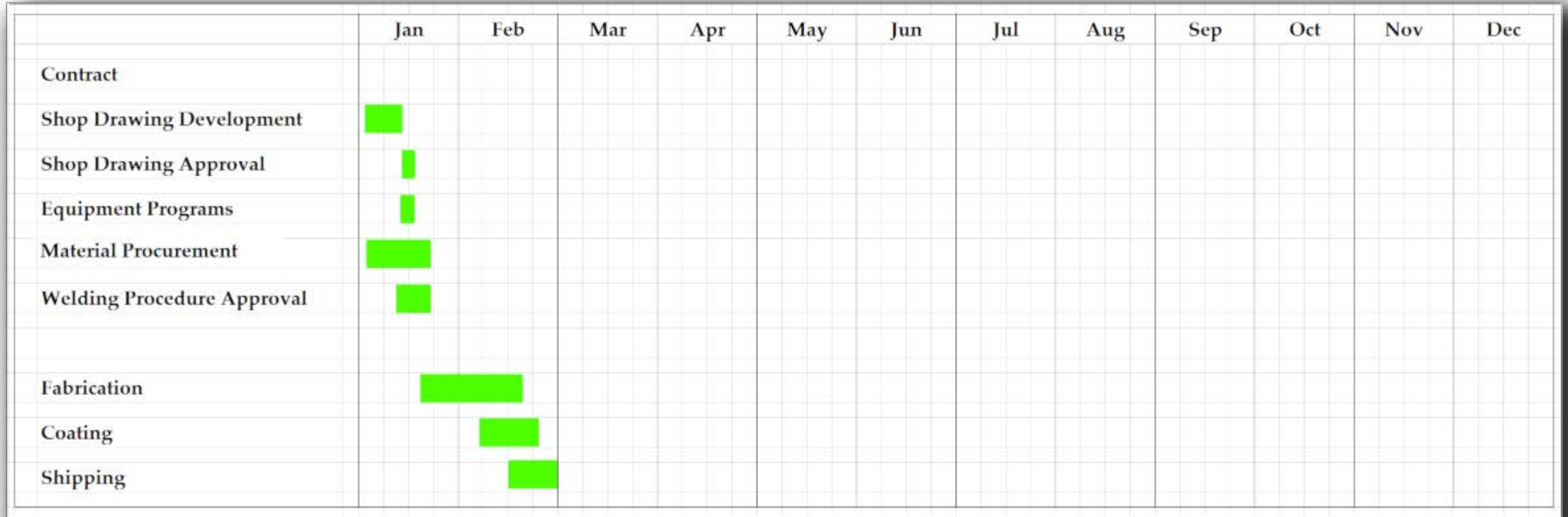
4 months

4 months

6 weeks

7 months

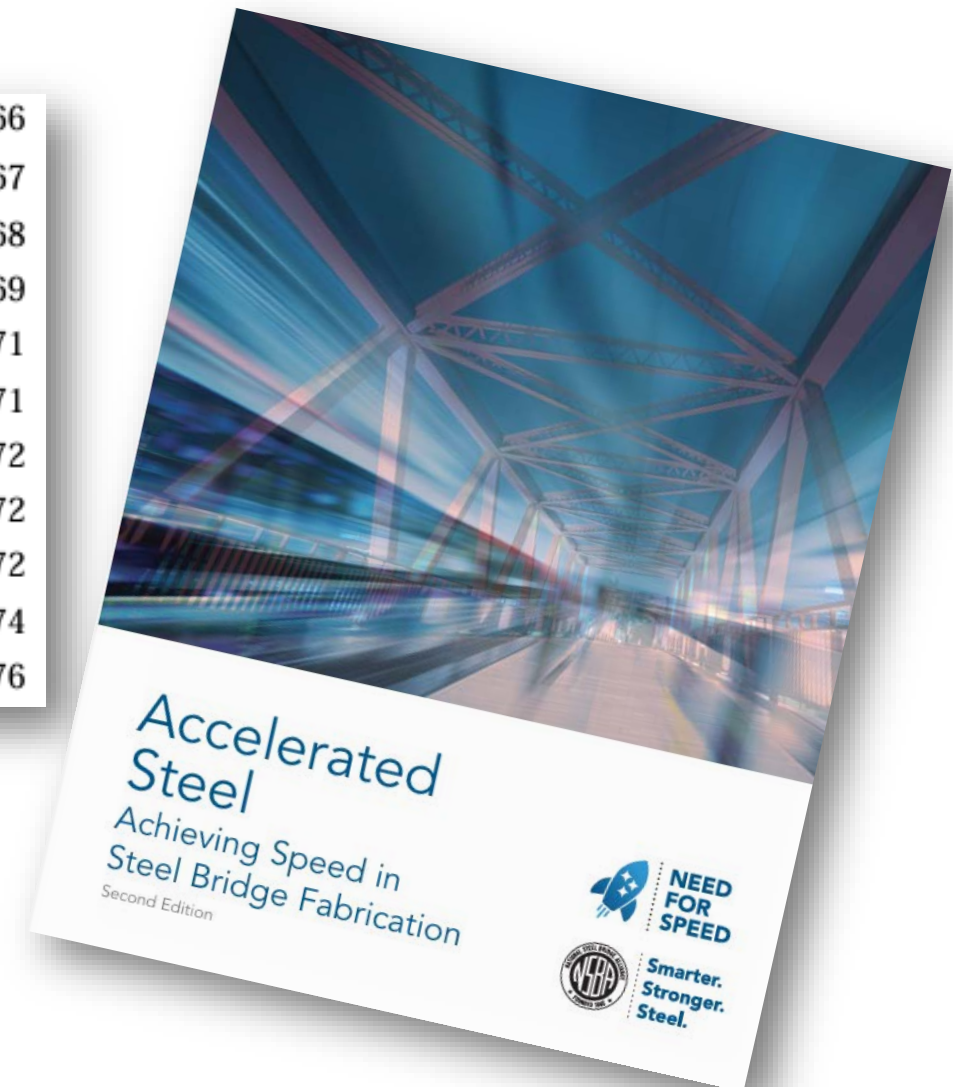
*If you want to go fast ...*





# 7.8 Emergency Project Playbook

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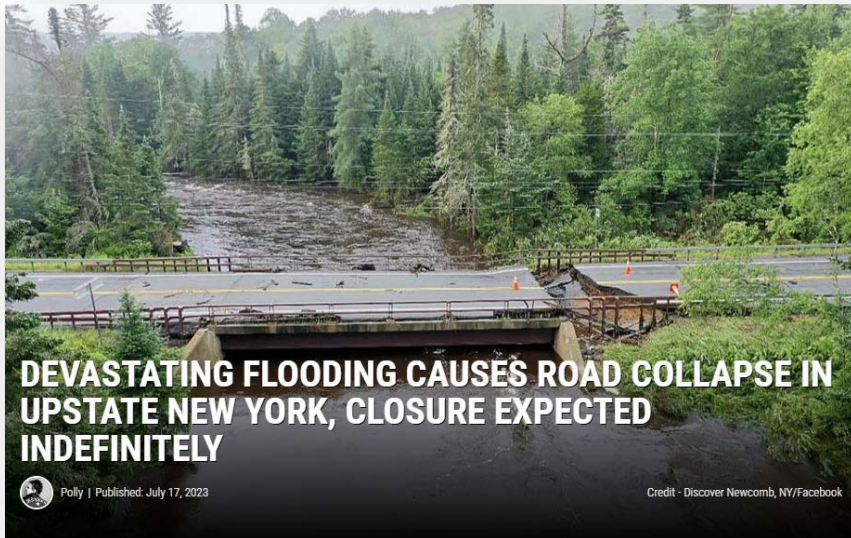


# NSBA Emergency Project Playbook

1. Recognize that fabricated steel can readily be procured in a matter of weeks



# NSBA Emergency Project Playbook

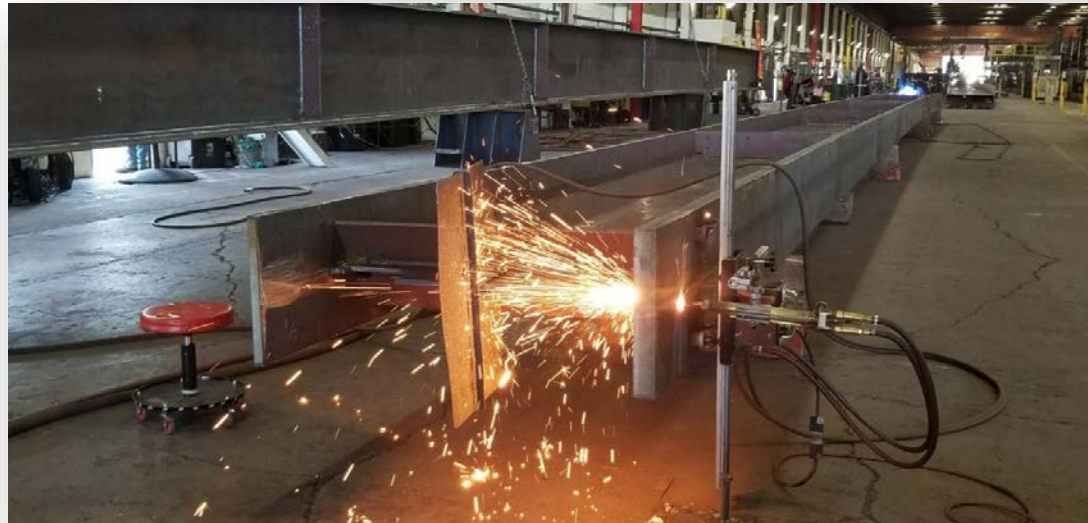
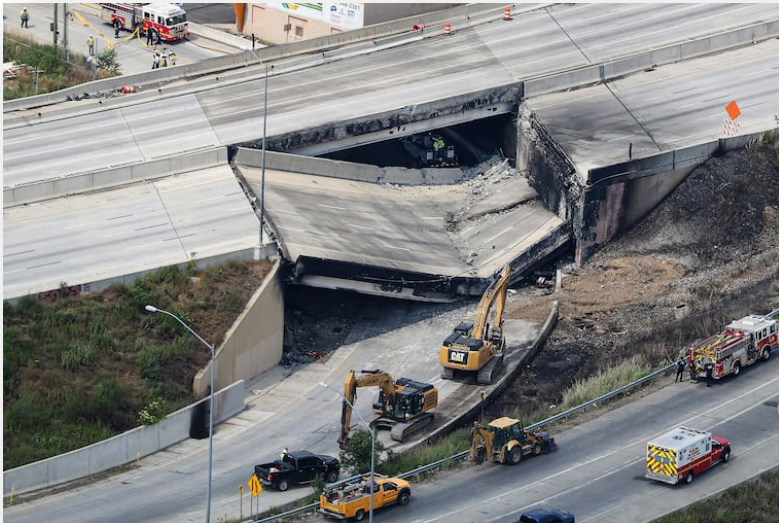


2. Form a partnership with a fabricator as quickly as possible.



# NSBA Emergency Project Playbook

3. Collaborate with the fabricator to determine how best to procure the main material needed for the project.



## Options

- mill – plate / shape
- other project
- other fabricator
- owner



# NSBA Emergency Project Playbook



4. Collaborate with the fabricator in design.





# NSBA Emergency Project Playbook

5. Facilitate rapid shop drawing approval.



# NSBA Emergency Project Playbook

6. Support changes in typical fabrication practices to facilitate speed.



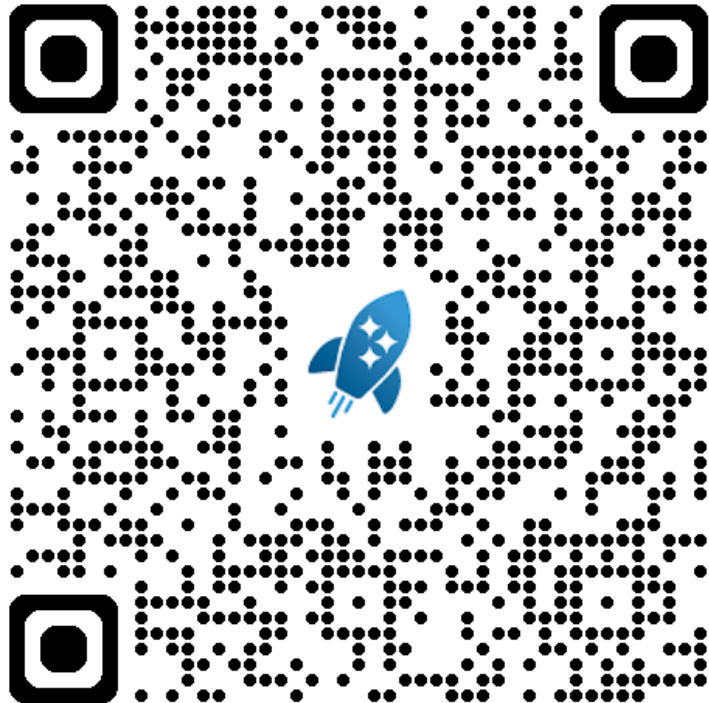
Tom Roberts, Hall Construction





# NSBA Emergency Project Playbook

1. Recognize that steel can be available in a matter of weeks
2. Form a partnership with a fabricator as soon as possible
3. Collaborate with the fabricator regarding material procurement
4. Collaborate with the fabricator in design
5. Facilitate rapid shop drawing and welding procedures approval
6. Support changes in typical fabrication practices



# Professional Development Questions

1. Although it usually takes about nine months to get a typical steel bridge, in an emergency situation, you can get steel in as few as [answer is "a"]
  - a. Two to three weeks
  - b. Six weeks
  - c. Two to three months
2. True or false: in emergency situations, shop drawings are not necessary [answer is false]
3. True or false: in emergency situations, it is recommended that the fabricator be allowed to weld without welding procedures [answer is false]