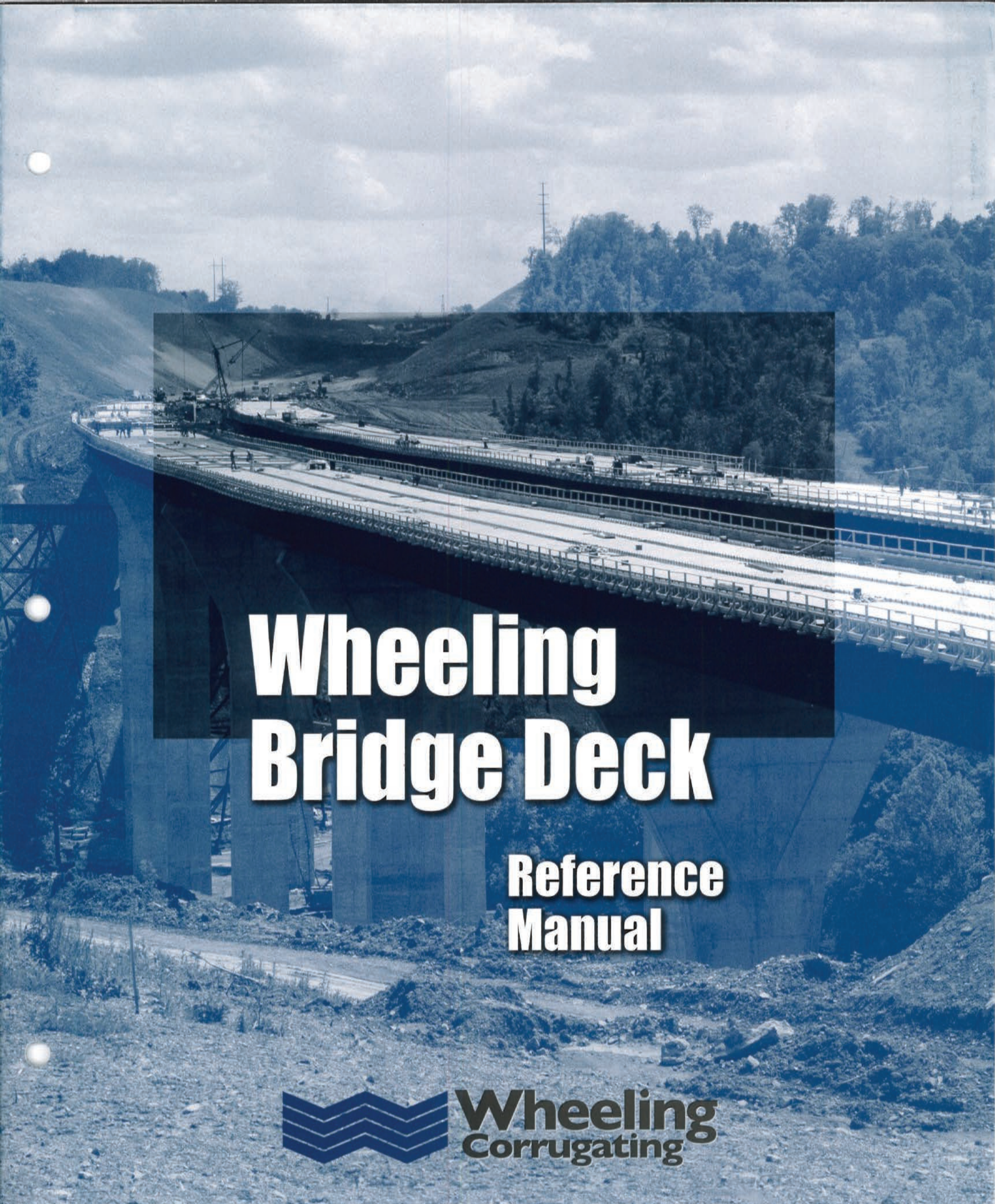


Wheeling Bridge Deck

Reference Manual

Wheeling Corrugating

Wheeling Bridge Form is a heavy-duty system for forming bridge deck slabs quickly and permanently. It is specially fabricated from high strength, galvanized steel. A uniform zinc coating, conforming to ASTM A924, latest edition, G165, protects all exposed parts of the form, adds an extra measure of durability.

Wheeling Bridge Form is custom fabricated to individual bridge specifications and adapts to pre-stressed concrete beams, built-up girders, or steel beam bridges, with or without shear connectors. Construction is fast, safe, and easy, and can be done in a fraction of the time needed to install conventional forms. When Wheeling Bridge Forms are used, the complete operation of slab deck forming, placing of steel, and pouring of concrete is a low-cost, smooth, and uninterrupted procedure.

Strength

- Wheeling Bridge Form is specially fabricated to sustain heavy loads.
- Adapts to most loading conditions up to 14′0″ stringer spacing.
- Helps control moisture during curing, gives deck greater strength.

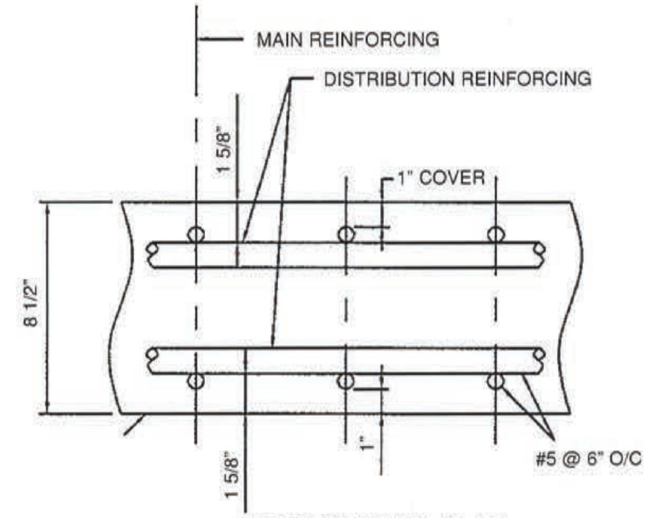
Speed

- Wheeling Bridge Form is fabricated, bundled, marked for placement, and shipped ready for installation.
- Work is done with small crews, completed much faster than with wood forming.
- Screw fastening is fast, positive, and easy.

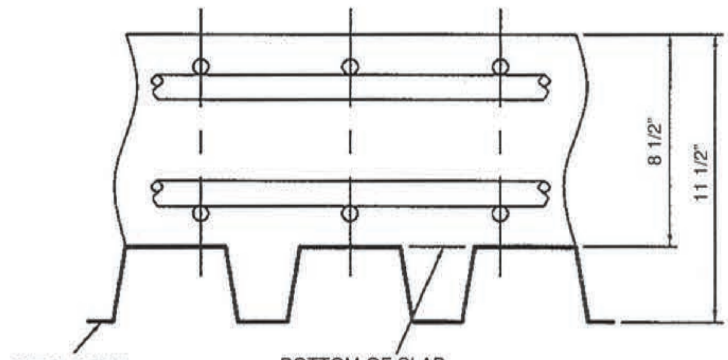
Safety

- Wheeling Bridge Form provides a solid, sure-footed working platform.
- No scaffolding or shoring is needed: removal of wooden forms no longer necessary.
- Safety factor is specially important over water, high density roadways, railroads, electric transmission systems, high bridges, etc.

Form Design Calculations



CONVENTIONAL SLAB



SLAB ON STEEL BRIDGE FORM

Project Description

Stringers – Plate Girders @ 9′-6″ o.c.
Slab design thickness – 8 1/2″
Bottom of slab located at top of form.

Slab Thickness for Dead Load Calculation

Average slab thickness shall be the conventional slab thickness plus rib fill.

Conventional slab	= 8 1/2″
Rib fill equivalent	= 1″
Total	9 1/2″

Design Loads/Construction Requirements

The metal forms shall be designed on the basis of dead load of form plus wet weight of reinforced concrete at 240 Kg/M^3 (150 pcf) plus 2.4 kPa (50 lb/sq ft) for construction loads. The unit working stress in the steel shall not be more than 0.725 of the specified minimum yield strength of the material furnished but not to exceed 250 Mpa (36,000 psi). Deflection under the weight of the forms, the plastic concrete and reinforcing steel shall not exceed 1/180 of the form span or 13 mm (0.5 in.) whichever is less. However, the deflection loading shall not be less than 5.8 kPa (120 lb/sq ft) total. For spans in excess of ten feet, the permissible deflection is not to exceed 19 mm (0.75 in) or L/240, whichever is less. The permissible form camber shall be based on the actual dead load condition. Camber shall not be used to compensate for deflection in excess of the foregoing limits.

The design span of the form sheets shall be the clear span of the form plus 50 mm (2 in) measured parallel to the form flutes. Physical design properties shall be computed in accordance with requirements of the American Iron and Steel Institute Specifications for the Design of Cold Formed Steel Structural Members.

Design Load

Wt. of slab 9.5 x 12.5	= 118.75 PSF
Wt. of form	= 4.00 PSF
Deflection Load	= 122.75 PSF
Construction Load	= 50.00 PSF
Stress Load	= 172.50 PSF

Form Span

Design span shall be clear span of form sheet plus two inches.

Stringer Spacing	9′6″
Flange Width	1′6″
	8′0″
Support Angle Flange 2 @ 2″	−0′4″
Required End Bearing	0′2″
Design Span	=7′10″

Required Physical Properties

Maximum Applied Moment for single span uniformly loaded sheet.

$$M = \frac{12WL^2}{8} \text{ in.-lb.}$$

$$M = \frac{12 \times 172.5 \times 7.83^2}{8} = 15{,}864 \text{ in.-lbs.}$$

Section Modulus Required equals Maximum Applied Moment divided by the Allowable Working Stress, which is 29 KSI for gages 16, 17 and 18 and 36 KSI for gages 19 thru 22.

S req'd (29 KSI) = 15,864 / 29,000 = 0.5470 $in.^3$
S req'd (36 KSI) = 15,864 / 36,000 = 0.4407 $in.^3$

For this application:

Allowable = 0.50″

$$I \text{ required} = \frac{5WL^4}{384E} \times 1728$$

$$I \text{ required} = \frac{5 \times 122.75 \times 7.83^4 \times 1728}{384 \times 29.5 \times 10^6 \times 0.50} = 0.7038 \text{ in.}^4$$

Select Pans

Selection of the correct gage is made from physical property table using the required physical properties previously determined.

Refer to Spec Sheets for form properties.
Example: Super 8 - 22 gage.

F = 36 KSI
I = 0.814 $in.^4$ provided > 0.7038 $in.^4$
S = 0.453 $in.^3$ provided > 0.4407 $in.^3$

Actual Stress and Deflection

Actual Stresses (f) and Deflections ( ) can be determined by ratios of physical properties required to those furnished.

Actual Stress

$$Fb = \frac{0.4407\ (36{,}000)}{0.453} = 35{,}022 \text{ PSI}$$

Actual Deflection

$$= \frac{0.7038\ (.50)}{.814} = 0.432 \text{ in.}$$

(Above) Bottom view. No forms to remove.

(Below) Top view of deck awaiting rebar and concrete