

# Placing Diaphragm Concrete

{ Why is the process important?

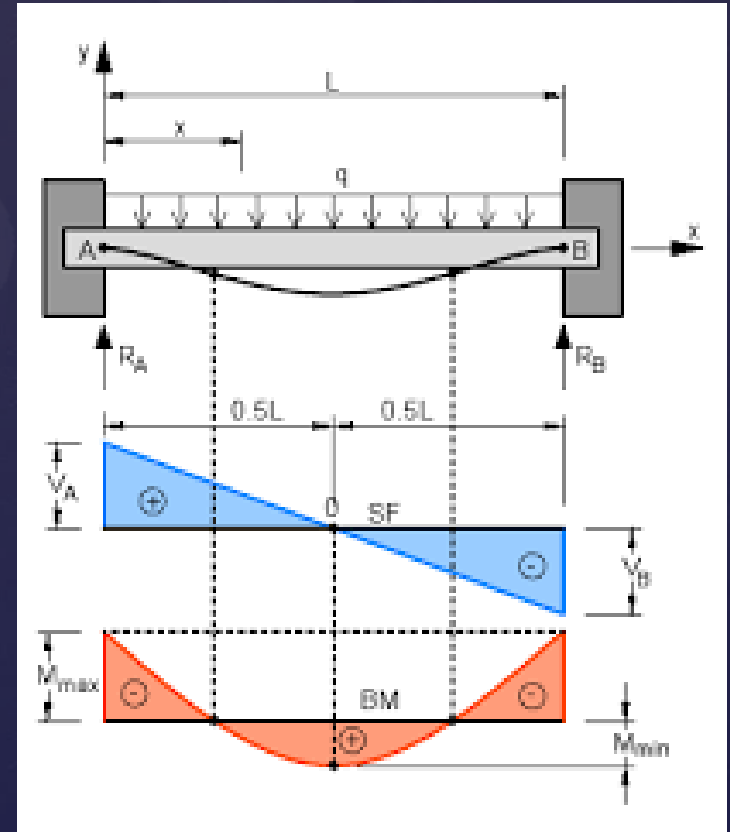
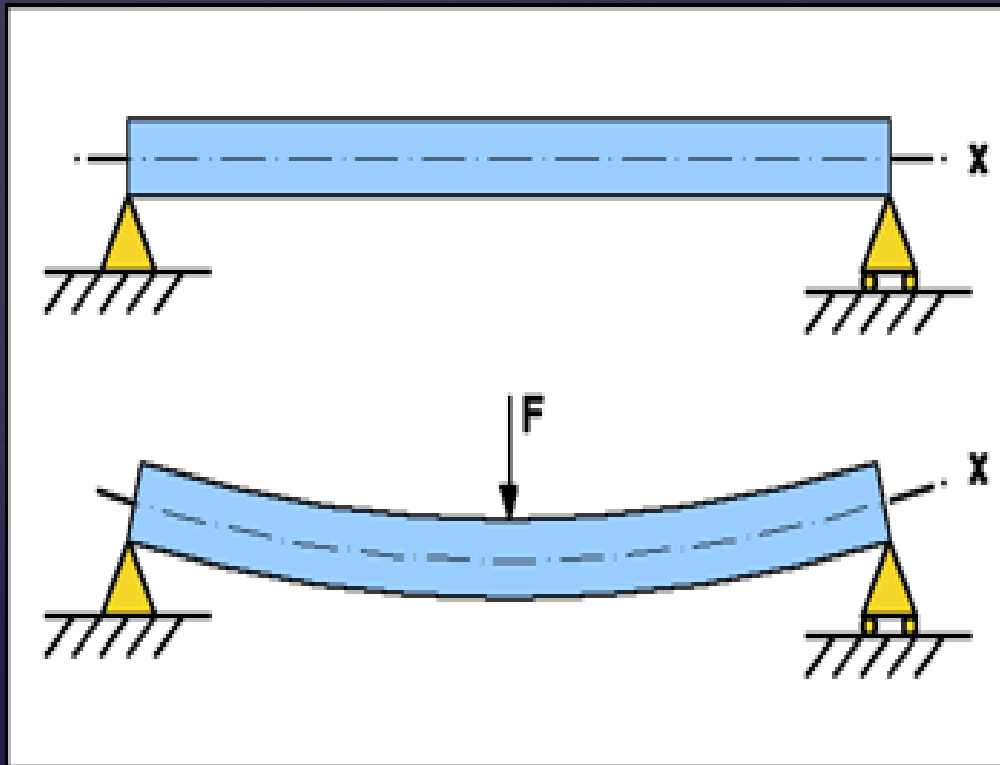
⌘ When placing a bridge deck with concrete girders there is a requirement that the diaphragms be placed in advance of the bridge deck. There are specific requirements in the plans that are very important.



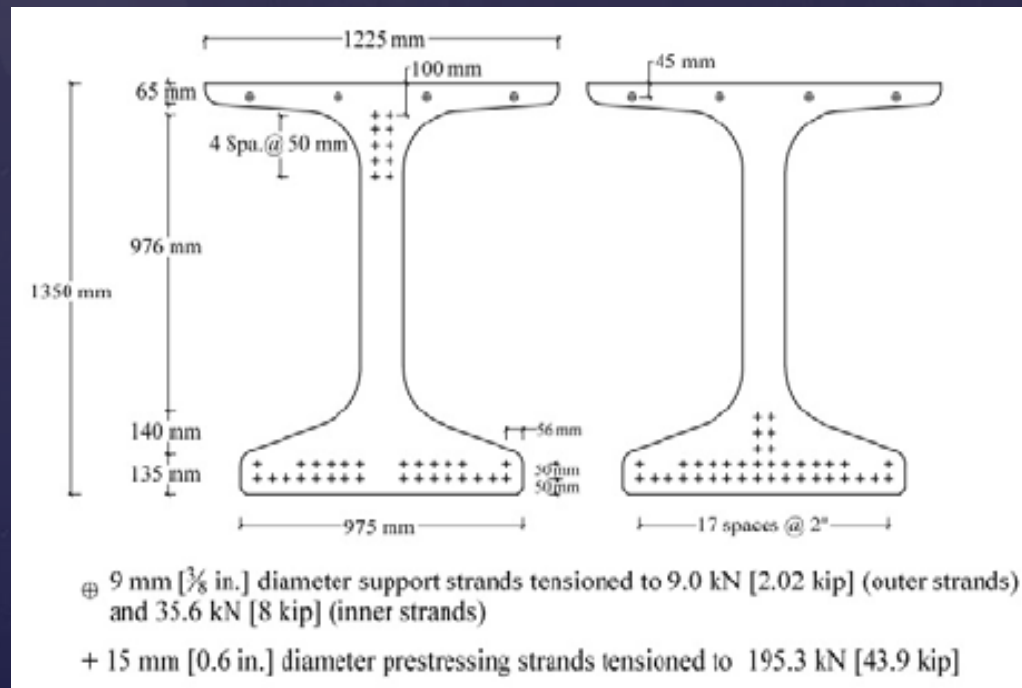
- ⌘ The plans state that diaphragm concrete should not be placed more than 2 hours ahead of the deck placement and no less than 30 minutes.
- ⌘ The concrete is placed in advance so that any settlement of the concrete in the diaphragm can occur.
- ⌘ It cannot be placed too far in advance because you need the concrete to be fluid so the girders can rotate.
- ⌘ This is also why a minimum pour rate is important. If you don't maintain a good pour rate the diaphragm concrete will begin to set before full deflection of the girders occur. An approved retarder must be used to delay the set by at least 2.5 hours.



- ⌘ Now that you know what the requirements are, why are they important?
- ⌘ First lets look at what happens to the girders when the concrete deck load is placed.
- ⌘ The girders at the ends will rotate.
- ⌘ If the diaphragm concrete is set, the girder is locked in and cannot rotate.



- ⌘ The locked in girders will distribute loading through the girders differently than if it were allowed to rotate.
- ⌘ If they are locked in, the top of the girders will be put in tension instead of compression.
- ⌘ As shown in the diagram there is very little rebar in the top flange. Rebar is utilized to take the tension loading since concrete is very weak in tension.
- ⌘ Therefore if put in tension the girders will not perform as intended.



⌘ It is important to remember to never place diaphragm concrete more than one diaphragm in advance of the deck pour. In the event of a breakdown or other delay in the pour, the diaphragm concrete will set and lock the girders in before deflection. **The only remediation will be to completely remove all of the diaphragm concrete!** It is also important to be aware of where the plans allow any transverse joints to be placed. These emergency header locations should be reviewed before the deck placement in case they need to be utilized.