

STRUCTURE BULLETIN

NCDOT Construction Unit

[Website](#) [email](#)

Current Issues: Stay-In-Place Form Grades

When stay-in-place (SIP) forms are ready to be installed for a bridge, attention needs to be taken to ensure that they are set to proper grade according to the calculated buildups. The buildup grades for each girder should be calculated and verified before installation of the SIP forms begins (see link to video to the right). When the stay-in-place form installers arrive on site, the buildups and shop drawings should be reviewed prior to installation beginning to make sure that everyone is familiar with the plans and installation instructions. If there are any special circumstances for SIP installation for that structure, these should be discussed then also. The SIP installers will often mark the grade for each form on the girder next to the bracket. The inspector should check these as the contractor begins the initial installation to make sure that the installer's process is correct, and that the form is installed at the correct elevation. Thereafter, check the forms periodically to make sure they continue to be installed correctly.



1. Stay-In-Place Form Grades
2. Concrete and Freezing Temperatures
3. Winter Training 2024
4. 2023 Structure Training Videos

Videos:

New videos available:

The 2023 Structures Inspection Training Videos from the classes last winter are now available on the Construction Unit Training YouTube page at the following link:

[Construction Unit Training Bridge Deck Buildups](#)

Training:

Winter training classes for 2024 will focus on structure rehabilitation methods. Look for an announcement via email in the coming weeks that will include training locations, dates, and registration information. This training will be for both new inspectors/engineers as well as veteran inspectors/engineers.

Checks are made by setting the level on the SIP forms as shown by either spanning the girder over the buildup point between the SIP forms or holding the level on the SIP and cantilevering over the buildup point for the outside girders. The measured distance between the girder and the bottom of the level on each buildup point should match the calculated buildup for that buildup point. On several projects within the last year, errors to the SIP forms have been found during the dry run for a deck pour. When the error to the SIP form grade is discovered this late in the deck construction process, corrective action is difficult to make because often all of the reinforcing steel has to be removed in order for grade corrections to be made to the SIP forms. Occasionally, there may be errors encountered with the deflections in the plans or with the shop drawings for the SIP forms. If these are discovered at any point as the buildups are being computed or when the SIP forms are being installed, please contact your Area Construction Engineer to help resolve. Most importantly, checking the forms as they are installed and making any corrections at that time can help to avoid much larger scale corrections later that can result if the SIP forms are installed at an incorrect grade.

Concrete and Cold Weather

Though winter officially arrives in a few days, freezing temperatures are already occurring overnight through most of the state. Please initiate discussions with your contractors about having cold weather protection for concrete several days prior to a scheduled concrete pour. Sections 420-7(B) Heated Enclosures and 420-7(C) Insulation gives instructions on how to protect freshly placed concrete when the air temperature is predicted to fall below 35 degrees after placement of the concrete, and fall or remain below 35 degrees before the cure time is complete.

Another precaution to take when the temperatures are predicted to drop below freezing is to remove any standing water in any orifice or confined void in the structure (e.g. dowel holes, grout pots, CSL tubes, etc.), or any other location where water may be surrounded by concrete (even if it is a temporary condition). Water expands to 9% above its liquid capacity when it freezes, and this expansion creates a force that can be 25,000 psi or higher depending on how far below freezing the temperature drops. This force is strong enough to cause fractures in concrete structures as the water expands. In some instances, we have seen damage to new structures that required extensive repair due to the freezing water causing large cracks in the concrete. If you have orifices that are accumulating water after rain events during construction, consider placing some RV antifreeze in these orifices prior to a rain event if the temperature is predicted to drop below freezing during or after the rain event. This will hopefully prevent the additional water that enters the orifice during the rain event from freezing until it can be removed when work resumes on the structure.

Area Construction Engineers:

Div	Contact	Phone
1&2	Randy Hall	282-402-9957
3&4	David Candela	910-524-4931
5	Liam Shannon	910-233-8380
6&8	John Partin	336-847-1226
7	Marcus Kiser	336-972-3412
9	Vickie Davis	704-202-0945
10	Christopher Fine	336-225-4266
11&12	Mark Biggerstaff	828-803-9954
13&14	Aaron Powell	828-694-7971

If you have a topic you would like to see addressed in a future edition of the Structure Bulletin, please [email](#) us at either aeerwood@ncdot.gov or aegriffith@ncdot.gov