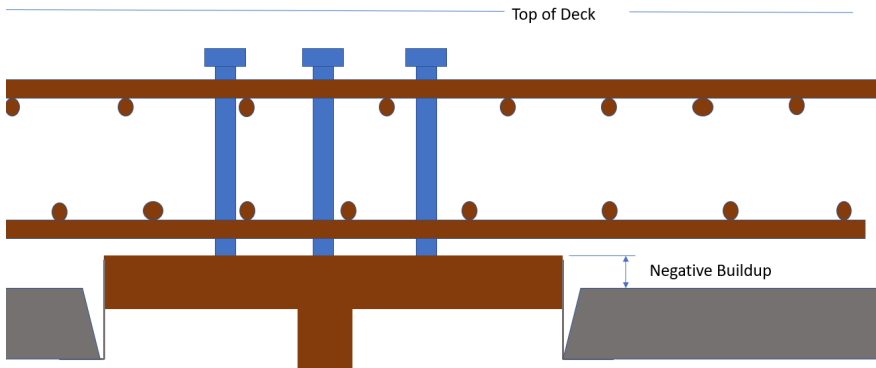


# STRUCTURE BULLETIN

## NCDOT Construction Unit

### Current Issues: Negative Buildups



Theoretical buildups are the difference in elevation between the top of the girder and the bottom of the deck slab (for concrete girders) or the bottom of the top flange and the bottom of the deck (for steel girders). The purpose in a buildup is to give a place to take out errors. We want the deck to be at plan grade, to ride good and to be the proper thickness. If there are errors in the girders from fabrication or errors in the substructure elevations from construction, the buildup is a cushion where we can take those errors out. In most cases this “cushion” is sufficient to correct any problems, but there are times when we don’t have enough space between the bottom of the deck and the top of the girder. This is called a negative buildup. In a nutshell, this means that the top of the girder is encroaching into the bottom of the deck, resulting in a thin deck.

In the sketch above you can see the top of the deck pan is below the top of the girder. This is a negative buildup. In this case the negative buildup was severe enough that the top of the shear studs (blue) is above the top mat of steel. This reduces the amount of cover over the top of the steel, in this case the shear studs, which will reduce the life of the deck. Concrete cover is the best corrosion protection we have. Large enough negatives can also cause the bottom mat of rebar to rest on the girder, which is unacceptable and can cause reduced cover on the entire mat.

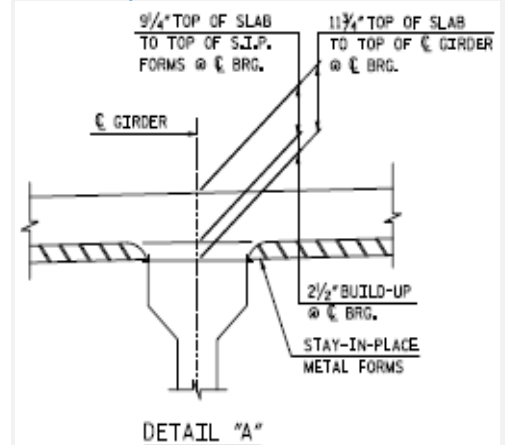
There are several potential causes of negative buildups:

- Excess girder camber: If there is too much camber in the girders then you could expect to see negative buildups at

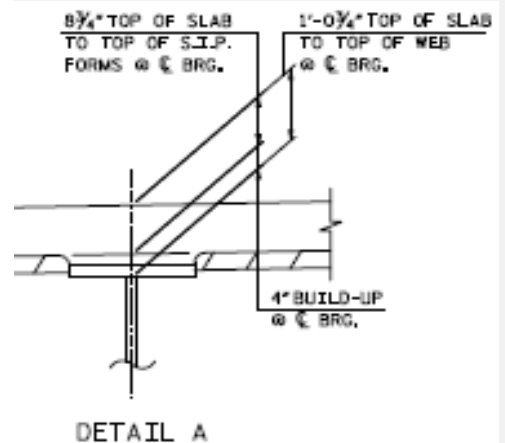


### 1. Current Issues: Negative Buildups

#### Buildup Details:



Concrete Girder Example

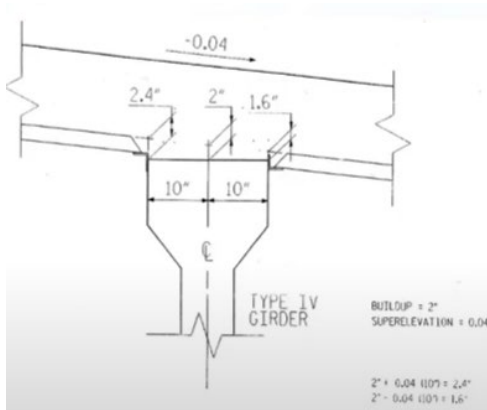


Steel Girder Example

mid span. Camber can easily be checked while concrete girders are still on the truck with a stringline and tape.

- Excess girder height: Concrete girders could have excess height due to excess concrete left on top instead of finished properly. This can easily be checked with a tape before the girders are set.
- Incorrect bridge seat elevations or bearing heights: Negative buildups could occur anywhere along the girder.
- Incorrect splice elevations on continuous steel girders: See [Structure Bulletin Volume 4, Issue 11](#) for more information.
- Incorrect calculations: See [Engineering Control](#) in the Construction Manual for proper procedures.

Negative buildups may not be apparent if the surveyor only shoots the center of the girder. If the bridge is superelevated and the girders are wide, there can be a significant difference in the buildup on each side of the girder. You can easily calculate this difference and be able to tell if there are negative buildups even if the surveyor only shoots the centerline of the girders.



The main point: **don't ignore negative buildups!** Notify the Engineer and figure out the cause before proceeding. Adjustments may be needed to correct the problem.

For a more detailed discussion of this you can watch the [Bridge Deck Buildups](#) video on Youtube.

Area Construction Engineers:

| Div   | Contact                          | Phone        |
|-------|----------------------------------|--------------|
| 1&2   | <a href="#">Randy Hall</a>       | 282-402-9957 |
| 3&4   | <a href="#">David Candela</a>    | 910-524-4931 |
| 5     | <a href="#">Troy Brooks</a>      | 336-972-4627 |
| 6&8   | <a href="#">John Partin</a>      | 336-847-1226 |
| 7     | <a href="#">Aaron Griffith</a>   | 336-215-9170 |
| 9     | <a href="#">Vickie Davis</a>     | 704-202-0945 |
| 10    | <a href="#">Christopher Fine</a> | 336-225-4266 |
| 11&12 | <a href="#">Mark Biggerstaff</a> | 828-803-9954 |
| 13&14 | <a href="#">Aaron Powell</a>     | 828-417-2629 |

**Aaron Griffith is now the Western Regional Bridge Construction Engineer**

Videos:

Inspection training videos can be found on the [Construction Unit YouTube playlist](#).

Training: It's Back!

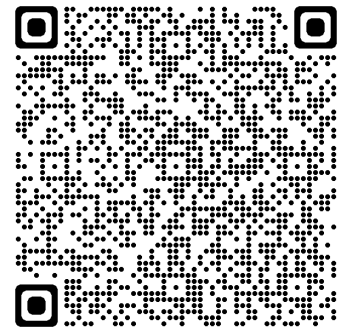
For the first time since 2016 we will be conducting the long structure training class this winter. It will be 12 hours of in person instruction at various locations around the state. We will post schedules here in the near future.

Structure Bulletins

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