Structures Management Unit
Working Days Preparation

Introduction

Due to recent changes in organizational structure within NCDOT and the Structures Management Unit (SMU), the **Private Engineering Firm Coordination** group is now requesting all Private Engineering Firms (PEF) to report the project **Working Days** as part of the typical scope of work. These Working Days are the expected time for construction for all structure elements. Structure elements include but are not limited to the following: bridges, culverts, retaining walls, and noise walls. The purpose of this document is to help the PEF understand the process for preparing and submitting Structure Working Days.

General

Structure Working Days are calculated using the NCDOT Working Days Guidelines for Structure Construction attached to this document. These Guidelines are developed and maintained by the NCDOT Construction Unit's State Bridge Construction Engineer. They are mandated by FHWA to be kept by all State Transportation Agencies and are updated whenever it is necessary. At the time of this document, the latest Guidelines are dated January 5, 2016.

The Structure Working Days are used by the NCDOT Contract Standards and Development Unit in preparing project contract times for Dates of Availability, Estimated Completion Dates and Final Completion Dates. These times can also assist Traffic Control in computing their required Intermediate Contract Times and Liquidated Damages.

Structure Working Days are computed as the total time, in days, that it would take one (1) bridge crew to build all of the necessary structural elements in a project. By beginning with one crew, the Contract Time Engineer has a reasonable start for a completion date and will then account for concurrent work, or add multiple crews, if necessary, to reduce the amount of time required.

Calculating Working Days

The Engineer is to use the attached Guidelines for calculating the total working days for each operation that is required for each structural element. The Guidelines are listed in the typical order of operations: bridge removal, substructure, and then superstructure. It is convenient to run down the Guideline list, in order, and calculate the time for each required operation. Each **Operation** is provided with a set amount of days or a production rate. Some operations

will specify an assumption or limiting factor that has been applied to the corresponding production rate.

Example #1:

Piles – End Bent, Interior Bent, or Pile Cluster (6-10 piles)
The production rate is good for a maximum of 10 piles. If you have less than 10 piles, use the production rate for the appropriate pile type. If you have more than 10 piles, you will need to factor the production rate. Let's say you have a bent or footing with 15 **steel H-piles**. Use a factor of 15/10 = 1.5. Then multiply 2 days by 1.5 and then use 3 days for this operation.

Example #2:

Form/Pour Caps
The production rate of 4 days is good for caps up to 40' in length. If you have a cap that is 70' long, use a factor of 70/40 = 1.75. Then multiply 4 days by 1.75 and use 7 days for this operation.

Each **Production Rate** is listed with guidance on calculating the working days for each type or option typically found in that operation.

Example #3:

Barrier Rails
If using **slip-forming**, use 500LF per day. If **formed and poured**, use 100 LF per day. If using **classic rail** or some other **special rai**l that requires forming and pouring, use 25 LF per day.

Always **round up** to the nearest whole number of days for each operation.

Once the Engineer has calculated the number of days for each required operation, the total days are added up for each structural element. The total days for each structural element are then added up for the Total Days required for the site or project.

Cover Sheet

The Total Working Days for each structural element is to be shown on the Cover Sheet which is provided in the attached Excel spreadsheet file <Working Days Worksheet.xlsx>.

The **Availability Date** is typically 6 weeks after the Letting Date and is to be shown here for reference.

The number of bridges, culverts and walls are shown here on this generic form. If a required structural element is not listed on this cover sheet or not included on this project, it may be added or removed from the worksheet as necessary. The number of structural elements may also be customized on the worksheet as necessary.

If working on a bridge replacement, the cover sheet should provide the **Existing Structure #**, **Sufficiency Rating** and **Estimated Remaining Life**. These items can be found in the Routine Bridge Inspection Report for each bridge. If the Inspection Report is not available, SMU will complete this information after the Working Days are submitted.

If a **Moratorium** is being used in a stream crossing, the cover sheet needs to provide the dates that work will not allowed in the stream. SMU will complete this information if necessary.

When completing the **Work Time Required**, fill in the number of working days that are calculated for each structural element: Bridges, Culverts or Walls. Provide as many rows as necessary for each structure. If working on a project with multiple structures, provide the Structure # or Station ID on the left or right side of the table.

The **Total Days** required for the site or project are divided by 16 in order to provide the **Total Months** required for construction. The Total Months should be rounded up to the **nearest quarter-month** and Total Days should be adjusted accordingly.

A breakdown of the Engineer's calculations showing quantities, assumed production rates, and number of days used shall also be provided by the PEF. If using a spreadsheet or some other program, all formulas must be shown in the output for transparency.

Special Cases

Often when a bridge or culvert is exceedingly long, or when a structure element is outside the average, certain assumptions can be made which will bring the working days into a more realistic time frame. The best practice is to calculate the time required for the operation using the provided production rates for one crew. Then make logical assumptions for concurrent work or multiple construction crews and reassign a new production rate. These assumptions should be provided in the breakdown and may be modified in coordination with SMU. This occurs most often when exceedingly long work bridges are required.

If a **Temporary Detour Bridge** is to be used, do **not** include the 48 days listed in the Production Rate. This time will be added in by the Contract Time Engineer.

When involved with a bridge replacement project, the **Asbestos Assessment** must be performed before the bridge demolition occurs. If the bridge removal is to be performed first, use the specified rate for the Asbestos Assessment. If other roadway work is required before the demolition or if there are multiple sites on the project, the Asbestos Assessment may be considered as concurrent work.

For **Pile Excavation**, use the same Production Rate as Drilled Piers less than 60" diameter.

Be sure to always include 5 days for **Curing**. Despite the description as typically a concurrent operation, this cure time should always be included with bent cap construction.

Final Review

Structure Working Days should be delivered when 90% Final Plans are turned in for review. SMU will review the working days, provide comments, and may adjust times as necessary. Ultimately, SMU will have control over the final working days that are presented to the Contract Time Engineer.

If the PEF is working on one of multiple sites on a project, the working days will be combined with these other sites. SMU will create a new cover sheet for the entire project and report the Working Days from each site.