

NCDOT Working Days Guidelines for Structure Construction *Revised: January 5, 2016*

Operation	Days / Production Rate
<u>Bridge Construction:</u>	
Temporary Detour Bridge	48 calendar days should be allowed for design, submittal, review and approval of temporary bridge plans. Only apply these if the detour is the controlling operation. Do not include this 48 days in the computed time to construct the bridge. 10 days for construction of the first span, on average. 7 days for construction of each additional span.
Asbestos Assessment for Bridge Demolition	3 days for any existing structure 500 ft. or less in length. 5 days for any existing structure greater than 500 ft. in length. These days should only be included if bridge demolition is the first major operation on the project. Otherwise this work should be concurrent with other operations.
Bridge Demolition/Removal Per Span	1 day for timber structures. 2 days for concrete decking on steel or prestress concrete girders. 4-5 days for concrete deck girders.
Unclassified Structure Excavation	500 CY per day. This is typically a concurrent operation.
Temporary Access Construction and Removal Per Phase - 1000 SF or less	2 days for a causeway. 6 days for a work bridge. May be concurrent with other operations. Consult with BCE for larger access areas.
Drilled Piers ≤ 60" in diameter	2 days for setup and preparation for the first pier in each stage. 25' per day if drilling in soil. 5' per day if drilling not in soil. 2 piers per day for steel and concrete placement.
Drilled Piers > 60" in diameter	2 days for setup and preparation for the first pier in each stage. 18' per day if drilling in soil. 3' per day if drilling not in soil. 2 piers per day for steel and concrete placement.
Drilled Pier - Slurry Construction	3 days for setup and preparation for the first pier in each stage. Follow drilling rates above , depending on diameter. 2 days per pier for slurry management, steel and concrete placement.
Footing Excavation - 2 Column Bent	1 day in soil. 5 days in rock. 10 days if cofferdam in water.
Piles - End Bent, Interior Bent, or Pile Cluster (6-10 piles)	3 days for concrete piles. 2 days for steel H-piles. 3 days for steel pipe piles, includes pipe plugs. 1 day for each PDA. Add 1 day per bent or per cluster if the piles are steel and over 40'.

NCDOT Working Days Guidelines for Structure Construction *Revised: January 5, 2016*

Operation	Days / Production Rate
Test Piles	1 day per bridge for an average job. 2 days for assessment and design. 8 days to cast (2), cure (5), and haul (1). May be a concurrent operation.
Sheeting Form/Pour Footings	640 SF per day . Includes driving and extracting. 2 days per footing. More time required for large footings or pile footings in water.
Form/Pour Columns	2 days per 2 column bent. Add 1 day if > 25' in height. 4 days for oval, hammer head columns.
Form/Pour Caps	4 days for caps ≤ 40' wide. Includes back wall/wings on end bents. 10 days for hammer head. 5 days curing. Applies to last cap only, typically a concurrent operation. 1 day per bridge, for epoxy coating the tops of caps at expansion joints, if applicable.
Slope Protection	2 days for rip-rap on avg. per structure. 4 days min. for concrete per structure. Allows for 2 days per end bent for alternate bay construction. May vary widely - dependent on the shape and the proximity/depth in water. Increase for wider bridges.
Placing Girders	1 day to first span for prep time. 1 day per span for precast concrete girders. 2 days per span for rolled beams. 3 days per span for steel girders ≤ 6' deep. 4 days per span for steel girders > 6' deep. This includes time for girder splices and diaphragm installation. Increase time for wide bridges. Consider adding 1 day per span over traffic, depending on restrictions.
Cored Slabs/Box Beams	1 day per span to place. 3 days per span to post-tension, grout shear keys, dowels, and PT block-outs. Curing of grout typically concurrent with work on an adjacent span or approach slab construction.
Deck Forming per Span (Assumed 85' - 90' typical span)	5 days per simple span on precast concrete girders or steel beams. 7 days for continuous steel girder or precast concrete girders. Add 1 day for concrete diaphragms. Applies to most bridges regardless of width due to overhang work controlling.
Deck Pour, Curing, Stripping	9 days for the first pour. Includes time for setting up the screed, dry runs, curing and stripping forms. Add 4 days for bridges with integral end bents. 7 days for each additional pour, to allow concrete to reach minimum strength before the next pour.

Operation	Days / Production Rate
Concrete Overlays for Cored Slab or Box Beam Spans	8 days for 1 to 4 spans. For bridges with more than 4 spans, use 2 days for each additional span.
Approach Slabs	8 days per slab for 25' approach slabs. 7 days per slab for 12' approach slabs. Includes installation of Reinforced Bridge Approach Fill or Sub-regional Tier Bridge Approach Fill, and curing time. Some of this work is likely concurrent with other operations, or deck curing times.
Expansion Joints	2 days per elastomeric concrete joint with foam seals. 3 days per expansion joint seal. Includes water test. 3 days per modular expansion joint.
Barrier Rails and Concrete Parapet	500 LF per day if slip-formed. 100 LF per day if formed and poured. 25 LF per day if classic or other special rail, formed and poured. Includes placing reinforcing steel.
Metal Bar Rails	1 day per span for 1 or 2 bar metal rails. 2 days per span for 3 bar rails.
Sidewalk and Median Island	3 days per span for sidewalk. 2 days per span for median island.
Grooving Deck	3 spans per day on a 2 lane bridge.
Erosion Control	2 days for installation of EC devices for bridge replacements over stream crossings.
Utility Systems and Closed Drainage Systems	1 day per 100 LF of bridge.
Rideability Testing and Corrective Work	5 days allowance on avg. Required for bridges over 1500 ft. in length. Occasionally required in Contracts for bridges shorter than 1500 ft. Must be completed prior to joint construction, where it may keep joints from being concurrent with other work.
Railroad Bridge Adjustments	Construction of an Overpass (Over the RR) - Add 50% to time associated with bridge demolition and girder erection. Add 10% to all other operations that take place within the RR R/W, including but not limited to substructure and bridge deck work. Construction of an Underpass (RR over Road) - Add 50% for substructure and superstructure, which includes waterproofing and drainage systems.
RR Detour (typical track underpass)	25 days (10 days grading, 3 days ballast, 12 days for fine grading ballast, ties, turnouts, and track). 15 days additional when trestle is required.

Operation

Days / Production Rate

Bridge Deck Rehabilitation:

Concrete Milling

2000 SY per day.

Hydrodemolition

400 SY per day. May be concurrent with milling as work can begin after milling progresses ahead of the operation.

Latex Modified Concrete Overlay

375 SY per day.

Class II Patching

20 SY per day. May be concurrent with LMC setup or other operations.

Cure patches

5 days. May be concurrent with other operations.

Cure overlay

5 days.

Very Early Strength LMC

1 lane of 1 span, per day. Includes milling, hydro-demolition, VES LMC, cure, and open to traffic.

Other Bridge Rehabilitation:

Shotcrete

125 CF per 5 days (500 SF) (Includes removal of unsound concrete, surface prep, placement, shaping, and curing.

Epoxy Injection

50 LF per day

Painting Structural Steel

2 days per span for avg. length and width of roadway (1 day per 2 beams). Includes cleaning, touch-up, and up to 3 coats. Additional time will be needed for removal of existing paint and time reduced if shop painting is required.

Culverts:

Excavation

5 days for a single barrel RCBC up to 70 ft., based on an excavation rate of 200 CY per day. Varies depending on site conditions and the amount of excavation required, presence of rock and need for diversion channel. Time includes placement of foundation conditioning material.

Forming

2 days for wing footing and bottom slab for single barrel culvert.

2 days for walls in a single barrel culvert.

2 days for top slab in a single barrel culvert.

50% increase for double barrel culvert.

100% increase for triple barrel culvert.

150% increase for quadruple barrel culvert.

All based on 70 ft. length.

If the culvert is to be constructed in stages, apply times to each stage.

Operation	Days / Production Rate
Placing Concrete	1 day for each culvert component listed above in each phase. Increase by 1 day for each additional barrel. If the culvert is to be constructed in stages, apply times to each stage.
Cure, Strip, Backfill	10 days after the final pour on any culvert up to 70 ft. Apply to each stage.
Culvert Extensions	Add 2 days to the above times to remove the existing wings and install dowels.
Precast Culverts	1 unit per day for casting. 5 days for curing, added to the last unit cast. 1-3 units per day delivered to the project, may be concurrent with casting and curing. 1 unit every 45 minutes to set in place.

Walls:

Retained Earth Walls	800 SF per day average. Varies according to geometry of the wall and shape of the panels. Generally 400 - 1200 SF per day.
Soil Nail Wall	10 nails per day . Includes grouting of nails and shotcrete. 3 days additional to form and pour 100 LF of cast in place (fascia) wall. 1 day additional when form liners are required.
Pile Panel Sound Barrier Wall	10 holes per day for drilling. Reduce to 5 if rock is expected. 10 holes per day to set piles and pour concrete. May be concurrent with drilling. 32 panels per day , set in place.
Reinforced Earth Wall	200 CY per day for excavation. 2 days for the initial section to prepare the bed. 2 days to pour the pad. 5 days to cure the pad. 500 SF per day to place panels. 200 LF per day for coping.

Guidelines for Applying Concurrent Operations

- Start with bridge removal, unclassified structure excavation and foundations. Sometimes a portion of the existing bridge will be removed to allow foundation work to proceed concurrently with bridge removal.
- If drilled piers are required, they control the project until complete. However, for multiple bent bridges, column and cap work will progress concurrently with the drilled piers.
- For longer structures, girder or cored slab erection may begin as substructure work advances.
- If access is provided outside the bridge, approach fills and end bent construction will also begin. If access is not provided, end bent construction will not be concurrent and will not start until interior bents are constructed and girders or cored slabs are erected.
- For cast-in-place decks:
 - Once the beams are erected, overhang construction and decking will take place concurrently, followed by reinforcing steel layout. The screed assembly and set up will take place concurrently with these operations.
 - A 7 day wet cure is required and is included in deck pour time, but will not keep subsequent approach slab work from progressing.
 - For dual bridges, many times the bridges will be constructed in a manner that decks will be cast concurrently so that waiting time is minimized. However, if grading work is controlling, there may be more advantage to complete one structure to allow access to other areas of the project.
- Approach slabs can begin as soon as an end span has been cast or cored slabs erected. Typically, approach slab work will start during the deck-curing period. If top down construction, approach slabs are not typically started until all cored slabs are erected. If cored slabs have a concrete overlay the approach slab can not begin until after the overlay has been cast.
- After approach slabs are constructed, the remaining bridge work, such as barrier rail, joints, and grooving, are typically concurrent with roadway operations.
- Waiting periods on end bent embankment fills should be considered when determining workdays.
- In stream moratoriums should be considered when determining working days.