



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

DATE: June 4, 2019
FROM: Materials and Tests Unit, Manufactured Products Group
SUBJECT: Acceptance Procedures for Reinforcing Steel

PURPOSE:

This memorandum is intended to explain the process that the Department uses to approve manufactures and suppliers of non-coated and coated reinforcing steel. It also attempts to explain the required documentation and procedures used to receive reinforcing steel on projects.

DEPARTMENT APPROVED VENDOR (PRODUCER/SUPPLIER):

The Materials and Tests Unit's Manufactured Products Group performs an independent review and approval of reinforcing steel, epoxy coated reinforcing steel, reinforcing steel-stainless, coated rebar fabricators, and dowel baskets producer/suppliers. Upon approval, each facility receives a Department Approved Facility Number. Producer/suppliers may have multiple Facility Numbers. A Facility Number must be present on the documentation that is discussed later in this memorandum.

Examples of Department approved producer/suppliers Facility Number formats:

- RS## Reinforcing Steel
- RSS## Reinforcing Steel-Stainless
- RC## Rebar Coaters
- CRF## Coated Rebar Fabricator##
- DB## Dowel Baskets

NCDOT Approved producer/suppliers can be found on the webpage:

<https://apps.ncdot.gov/vendor/approvedproducts/Producer.aspx>

Reinforcing steel mills that are Department approved go through extensive internal sampling and testing protocols to produce ASTM grade reinforcing steel. In addition, these facilities participate in the NTPEP REBAR program in which they undergo an extensive 3rd party audit that is witnessed by NCDOT, and extensive sampling and testing of reinforcing steel samples by separate Departments of Transportation. For additional information regarding this program please visit: http://www.ntpep.org/Pages/REBAR_WWR.aspx

Rebar coating facilities that are Department approved go through extensive internal sampling and testing protocols that are required by their certification agency called the Concrete Reinforcing Steel Institute (CRSI). In order to maintain their Department approved status, they must successfully meet the requirements of the Epoxy Plant Certification Program. For additional information regarding this program please visit:

<https://www.crsi.org/index.cfm/certification/plant>

MATERIAL ACCEPTANCE

The requirements of both the Project Acceptance procedures and Independent Assurance must be met for every Federal Aid project. Independent Assurance procedures are not required for projects that are solely State Funded.

PROJECT ACCEPTANCE PROCEDURES

PROJECT GUIDANCE

1. ALL shipments of reinforcing steel must include a type 1 certified mill test report and an M&T form 913.
2. Reinforcing steel used for NCDOT work must be ASTM A615, Grade 60. Concrete pavement tie bars should be ASTM A615, Grade 40. Other grades of steel may be required by Special Provision.
3. Sample both un-coated and coated bars of each size when the shipment does not provide the required documentation and contact M&T for additional guidance. Only one sample per size per type of bar is needed. See below for sample size and sample frequencies.
4. When both un-coated and coated bars of the same size are used on a project, random independent assurance sampling of both un-coated and coated bars is required.
5. Materials and Tests should be notified as soon as material is received so as to obtain the independent assurance sample and not create undo project delays.
6. When entering the information into HICAMS please see the attached example HICAMS cards listed in attachment one (1) through three (3).

Uncoated Reinforcing Steel & Stainless Reinforcing:

For un-coated reinforcing and stainless steel, use the following:

1. The shipment of reinforcing steel shall come from a Department approved reinforcing steel (RS##) producer/supplier.
2. All reinforcing steel must meet the following requirements:
 - a. Buy America Act
 - b. Provide a type 1 certified mill test report for each size and heat number of reinforcing steels supplied.
 - i. Note: A type 1 certification is defined in *Standard Specifications*, Section 106-3 (E).
3. A completed Materials and Tests Unit Form 913. The Form 913 must include the Department approved Facility ID number.

Note: The quantities on the Form 913 must match or exceed the quantities of each size of reinforcing bar reported on the corresponding Material Received Report (MRR). If the Materials and Tests Unit Records Section cannot reconcile the quantities, the MRR will be sent back to the Resident Engineer for clarification or additional information.

4. Project Acceptance sampling of reinforcing is not necessary if the shipment is accompanied by a Form 913.
5. If the shipment does not include a Form 913, Project personnel must take a sample of each size of reinforcing steel in the shipment. Please contact the Materials and Tests Unit before accepting this material.

Note: The sample bars shall come from steel used in the project and the sample bars are to be replaced by splice bars of enough length to get a splice distance of at least 30 diameters on each end. See splice chart in contract drawings and listed in Table 1.

Sample Size:

The Department defines a reinforcing sample as the following:

- One sample is defined as two pieces of reinforcing steel cut to the dimensions listed below:
 - If the sample is saw cut, the sample length must be thirty (30") inches or longer.
 - If the sample is flame cut, the sample length must be thirty-six (36") inches or longer.

Sample Frequency:

Sample frequencies are based on the total project quantities and as listed below:

- One set of samples per size of reinforcing shall be taken for quantities $\leq 40,000$ pounds.
- One sample shall be obtained within the first 40,000 lbs, and an additional sample for each 40,000 lbs or fraction thereafter.
- A sample shall be obtained from any shipment NOT having a Form 913.

No payment will be made for the samples or splice bars.

Small Quantity Samples:

When accepting small quantities of reinforcing steel, the Resident Engineer may waive these procedures. No more than three-hundred and fifty (350 lbs.) pounds per project shall be accepted this way and the MRR must state that the Resident Engineer accepted the reinforcing steel as a small quantity.

Coated Reinforcing Steel:

Each shipment of epoxy coated reinforcing steel can be accepted by using the following:

1. The shipment of coated reinforcing shall come from a Department approved rebar coating (RC##) producer/supplier.
2. All reinforcing steel must meet the following requirements:
 - a. Buy America Act
 - b. Provide a type 1 certified mill test report for each size and heat number of reinforcing steels supplied.
 - i. Note: A Type 1 certification is defined in *Standard Specifications*, Section 106-3 (E)

3. All shipments of coated reinforcing steel will include a Form 913, Form ER-02, production documentation, and inspection documents with the Department approved facility ID number.
4. Project Acceptance sampling of reinforcing is not necessary if the shipment is accompanied by a Form 913 and Form ER-02.
5. If the shipment does not include a Form 913 and Form ER-02, Project personnel must take a sample of each size of reinforcing steel in the shipment. Please contact the Materials and Tests Unit before accepting this material.

Note: The quantities on the Form 913 must match or exceed the quantities of each size of reinforcing bar reported on the corresponding Material Received Report (MRR). If the Materials and Tests Unit Records Section cannot reconcile the quantities, the MRR will be sent back to the Resident Engineer for clarification or additional information.

Note: The sample bars shall come from steel used in the project and the sample bars are to be replaced by splice bars of enough length to get a splice distance of at least 30 diameters on each end. See splice chart in contract drawings and listed in Table 1.

Sample Size:

The Department defines reinforcing samples as the following:

- One sample is defined as two pieces of reinforcing steel cut to the dimensions listed below:
 - If the sample is saw cut, the sample length must be thirty (30") inches or longer.
 - If the sample is flame cut, the sample length must be thirty-six (36") inches or longer.

Sample Frequency:

Sample frequencies are based on the total project quantities and as listed below:

- One set of samples per size of reinforcing shall be taken for quantities $\leq 40,000$ pounds.
- One sample shall be obtained within the first 40,000 lbs, and an additional sample for each 40,000 lbs or fraction thereafter.

No payment will be made for the samples or splice bars.

Small Quantity Samples:

When accepting small quantities of reinforcing steel, the Resident Engineer may waive these procedures. No more than three-hundred and fifty (350 lbs.) pounds per project shall be accepted this way and the MRR must state that the Resident Engineer accepted the reinforcing steel as a small quantity.

CONTRACTOR/PRODUCER/SUPPLIER GUIDANCE

TABLE 1.

SAMPLE BAR SPLICE CHART		
Maximum splice bar lengths to replace 30" samples (Epoxy Coated)	Bar Size	Maximum splice bar lengths to replace 30" samples (Un-Coated & Stainless)
6'-10"	#3	6'-2"
8'-2"	#4	7'-4"
9'-8"	#5	8'-6"
11'-10"	#6	9'-8"
13'-4"	#7	10'-10"
14'-10"	#8	12'-10"
16'-4"	#9	13'-2"
18'-2"	#10	14'-6"
19'-10"	#11	15'-10"

Note: Shipments of reinforcing steel should be accompanied by splice bars of the appropriate size to replace/repair reinforcement when samples are obtained. Precut "sample bars" are not-acceptable as they are not "random and independent" verification of the shipment.

INDEPENDENT ASSURANCE PROCEDURES

The Code of Federal Regulations Title 23 Part 637 Subpart B titled "Construction Inspection and Approval" requires State transportation departments to assure the quality of materials used in all Federal-aid highway projects on the National Highway System. State transportation departments are to maintain an acceptance and independent assurance program that qualifies product vendors and performs random sampling to determine the quality of a product as specified in the contract documents.

PROJECT GUIDANCE

Independent Assurance samples are required for reinforcing steel on Federal Aid projects. These samples are taken by the Materials and Tests Technician when the material first arrives on the project.

Samples of coated and un-coated reinforcing steel are to be taken from bars actually used on the project.

Materials and Tests should be notified as soon as material is received so as to obtain the Independent Assurance sample in a timely manner and not create undo project delays.

No payment will be made for the samples or splice bars.

MATERIALS TECHNICIAN GUIDANCE

Obtain samples of each size and type (coated and uncoated) of reinforcement used.

Sample Size:

The Department defines reinforcing samples as the following:

- One sample is defined as two pieces of reinforcing steel cut to the dimensions listed below:
 - If the sample is saw cut, the sample length must be thirty (30”) inches or longer.
 - If the sample is flame cut, the sample length must be thirty-six (36”) inches or longer.

Sample Frequency:

Sample frequencies are based on the total project quantities and as listed below:

- One set of samples per size of reinforcing shall be taken for quantities $\leq 40,000$ pounds.
- One sample shall be obtained within the first 40,000 lbs, and an additional sample for each 40,000 lbs or fraction thereafter.

The Department approved facility ID number and the HEAT Number is associated with each sample must be reported on the sample card. See attachment 1 through 3 for an example HICAMS cards for uncoated reinforcing steel, coated reinforcing steel and stainless-steel reinforcing respectively. Additionally, HEAT numbers must be entered as an “Alternate ID”. For CEI staff this may require their HICAMS security settings to be upgraded to permit this entry.

Please also note that multiple heat numbers may be listed as permitted by ASTM A615 that states; “it shall be permissible for the manufacturer to make a full-size bundle at the end of a heat by adding bars from a consecutively rolled heat of the same nominal chemical composition. The manufacturer shall identify a bundle consisting of bars from two heats with the identification number of the first heat rolled or identify both heats.

Note: The Independent Assurance Sample bars shall come from steel used in the project and the sample bars are to be replaced by splice bars of enough length to get a splice distance of at least 30 diameters on each end. See splice chart in contract drawings and listed in Table 1.

Splice Overlap:

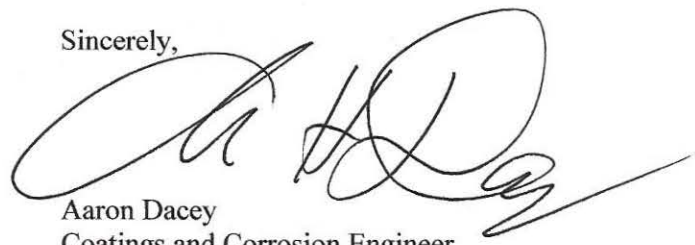
The minimum length for splice overlap is illustrated in Attachment #4. Sample Bar Replacement Length.

REFERENCES

2018 NCDOT *Standard Specifications for Roads and Structures*
Department Epoxy Coated Reinforcing Steel Quality Control/Quality Assurance Program

If there are questions feel free to contact myself; Aaron Dacey at ahdacey@ncdot.gov, or the Metals Engineer, Randy Porter of the Materials and Tests Unit at srporter@ncdot.gov.

Sincerely,

A handwritten signature in black ink, appearing to read 'A. Dacey', with a long horizontal flourish extending to the right.

Aaron Dacey
Coatings and Corrosion Engineer

- Cc.
- Associated General Contractors
- Reinforcing Steel Suppliers
- Rebar Coaters
- Reinforcing Steel-Stainless Suppliers
- Coated Rebar Fabricators
- Division Engineers
- Resident Engineers
- Materials and Tests Unit

SAMPLE CARD

HiCAMS #	<input type="text" value="954050"/>	CONTRACT	<input type="text" value="C204108"/>
BARCODE	<input type="text"/>	FIELD ID	<input type="text" value="1"/>
MATERIAL	<input type="text" value="Reinforcing Steel, Plain"/>	PO / OTHER ID	<input type="text"/>
SAMPLE OWNER	<input type="text" value="MI"/>	RE	<input type="text" value="Beamer, PE, Ryan"/>
TESTING CATEGORY	<input type="text" value="Verification"/>	LINE ITEM#	<input type="text"/>
CHECK SAMPLE	<input type="checkbox"/>		
RELATED	<input type="text"/>		
SAMPLE ID	<input type="text"/>		
CORRELATED	<input type="text"/>		
SAMPLE ID	<input type="text"/>		
# OF PIECES	<input type="text" value="2"/>	REPRESENTED QTY	<input type="text" value="35,947.000"/>
TO BE USED IN	<input type="text" value="Bridge"/>		
COMMENT	<input type="text" value="#11 Plain Reinforcing Steel"/>		

FIELD TEST DETAILS

TOTAL WATER (GALS/CY)	<input type="text"/>
AIR CONTENT [%]	<input type="text"/>
SLUMP [IN]	<input type="text"/>
CONCRETE: TYPE CURING	<input type="text"/>
TEMPERATURE OF AIR [F]	<input type="text"/>
TEMPERATURE OF CONCRETE [F]	<input type="text"/>
OTHER	<input type="text"/>

SAMPLE DATE	<input type="text" value="03/11/2019"/>	SAMPLED BY	<input type="text" value="Strickland Don A"/>
SAMPLE FROM	<input type="text" value="PROJ"/>	ROUT DESC.	<input type="text" value="Glen Laurel Rd. To"/>
STRUCTURE	<input type="text"/>	LOCATION	<input type="text" value="-CL-"/>
ROUTE#	<input type="text" value="NC"/>	OFFSET DISTANCE	<input type="text"/>
MAP#	<input type="text"/>	STATION FROM	<input type="text" value="64"/>
COUNTY	<input type="text" value="Johnston"/>	STATION TO	<input type="text" value="64"/>
PRODUCER/ SUPPLIER/PLANT ID	<input type="text" value="Nucor Steel,
Nucor Steel - Birmingham, AL - RS34"/>	COASTAL PLAIN	<input type="text" value="N"/>
OTHER PRODUCER / SUPPLIER	<input type="text"/>		
PRODUCT NAME	<input type="text"/>		
DATE PRODUCED	<input type="text" value="10/12/2018"/>		
CONCRETE MIX ID	<input type="text"/>		
AMD ID	<input type="text"/>		
JMF ID	<input type="text"/>		
SHELF LIFE DATE	<input type="text"/>		

This Information to be written by hand.

CEMENT SPECIFICATION DETAILS

LOCATION OF MILL	<input type="text"/>
LOCATION OF TERMINAL	<input type="text"/>
DATE OF MATERIAL RECEIVED	<input type="text"/>
LENGTH OF STORAGE	<input type="text"/>
CONTRACTOR	<input type="text"/>

OTHER COMMENTS

SAMPLE CARD

HiCAMS #	<input type="text" value="951229"/>	CONTRACT	<input type="text" value="DD00258"/>
BARCODE	<input type="text"/>	FIELD ID	<input type="text" value="1"/>
MATERIAL	<input type="text" value="Reinforcing Steel, Epoxy Coated"/>	PO / OTHER ID	<input type="text"/>
SAMPLE OWNER	<input type="text" value="MI"/>	RE	<input type="text" value="Keeter, PE, P. Gray"/>
TESTING CATEGORY	<input type="text" value="Pretest"/>	LINE ITEM#	<input type="text"/>
CHECK SAMPLE	<input type="checkbox"/>		
RELATED	<input type="text"/>		
SAMPLE ID	<input type="text"/>		
CORRELATED	<input type="text"/>		
SAMPLE ID	<input type="text"/>		
# OF PIECES	<input type="text" value="1"/>	REPRESENTED QTY	<input type="text" value="6,822.000"/>
TO BE USED IN	<input type="text" value="Bridge"/>		
COMMENT	<input type="text" value="#5 Epoxy Coated Reinforcing Steel"/>		

FIELD TEST DETAILS

TOTAL WATER (GALS/CY)	<input type="text"/>
AIR CONTENT [%]	<input type="text"/>
SLUMP [IN]	<input type="text"/>
CONCRETE: TYPE CURING	<input type="text"/>
TEMPERATURE OF AIR [F]	<input type="text"/>
TEMPERATURE OF CONCRETE [F]	<input type="text"/>
OTHER	<input type="text"/>

SAMPLE DATE	<input type="text" value="02/21/2019"/>	SAMPLED BY	<input type="text" value="Strickland Don A"/>
SAMPLE FROM	<input type="text" value="PROJ"/>	ROUT DESC.	<input type="text" value="Batchlor Road"/>
STRUCTURE	<input type="text" value="111"/>	LOCATION	<input type="text" value="CL"/>
ROUTE#	<input type="text" value="SR"/>	OFFSET DISTANCE	<input type="text"/>
MAP#	<input type="text"/>	STATION FROM	<input type="text" value="15"/>
COUNTY	<input type="text" value="Nash"/>	STATION TO	<input type="text" value="15"/>
PRODUCER/ SUPPLIER/PLANT ID	<input type="text" value="CMC Commerical Metals Company,
CMC Rebar - RC12"/>	COASTAL PLAIN	<input type="text" value="N"/>
OTHER PRODUCER / SUPPLIER	<input type="text"/>		
PRODUCT NAME	<input type="text"/>		
DATE PRODUCED	<input type="text" value="07/22/2018"/>		
CONCRETE MIX ID	<input type="text"/>		
AMD ID	<input type="text"/>		
JMF ID	<input type="text"/>		
SHELF LIFE DATE	<input type="text"/>		

This Information to be written by hand.

CEMENT SPECIFICATION DETAILS

LOCATION OF MILL	<input type="text"/>
LOCATION OF TERMINAL	<input type="text"/>
DATE OF MATERIAL RECEIVED	<input type="text"/>
LENGTH OF STORAGE	<input type="text"/>
CONTRACTOR	<input type="text"/>

OTHER COMMENTS

SAMPLE CARD

HiCAMS #	<input type="text" value="816632"/>	CONTRACT	<input type="text" value="C202185"/>
BARCODE	<input type="text" value="1C012700000000000048266"/>	FIELD ID	<input type="text" value="RSS-3"/>
MATERIAL	<input type="text" value="Reinforcing Steel, Stainless"/>	PO / OTHER ID	<input type="text"/>
SAMPLE OWNER	<input type="text" value="MI"/>	RE	<input type="text" value="Hernandez, PE, Pablo"/>
TESTING CATEGORY	<input type="text" value="Verification"/>	LINE ITEM#	<input type="text"/>
CHECK SAMPLE	<input type="checkbox"/>		
RELATED	<input type="text"/>		
SAMPLE ID	<input type="text"/>		
CORRELATED	<input type="text"/>		
SAMPLE ID	<input type="text"/>		
# OF PIECES	<input type="text" value="2"/>	REPRESENTED QTY	<input type="text" value="20,000.000"/>
TO BE USED IN	<input type="text" value="Bridge Replacement"/>		
COMMENT	<input type="text" value="# 3 Bar, Heat # 750118"/>		

FIELD TEST DETAILS

TOTAL WATER (GALS/CY)

AIR CONTENT [%]

SLUMP [IN]

CONCRETE: TYPE CURING

TEMPERATURE OF AIR [F]

TEMPERATURE OF CONCRETE [F]

OTHER

SAMPLE DATE	<input type="text" value="07/08/2016"/>	SAMPLED BY	<input type="text" value="Thomas Grady Q"/>
SAMPLE FROM	<input type="text" value="PROJ"/>	ROUT DESC.	<input type="text"/>
STRUCTURE	<input type="text"/>	LOCATION	<input type="text" value="-L-"/>
ROUTE#	<input type="text" value="NC"/>	OFFSET DISTANCE	<input type="text"/>
MAP#	<input type="text"/>	STATION FROM	<input type="text"/>
COUNTY	<input type="text" value="Dare"/>	STATION TO	<input type="text"/>
PRODUCER/ SUPPLIER/PLANT ID	<input type="text" value="Salit Specialty Rebar, LLC,
Salit Specialty Rebar - Buffalo Plant -
RSS2"/>	COASTAL PLAIN	<input type="text" value="Y"/>
OTHER PRODUCER / SUPPLIER	<input type="text"/>		
PRODUCT NAME	<input type="text"/>		
DATE PRODUCED	<input type="text"/>		
CONCRETE MIX ID	<input type="text"/>		
AMD ID	<input type="text"/>		
JMF ID	<input type="text"/>		
SHELF LIFE DATE	<input type="text"/>		

This Information to be written by hand.

CEMENT SPECIFICATION DETAILS

LOCATION OF MILL

LOCATION OF TERMINAL

DATE OF MATERIAL RECEIVED

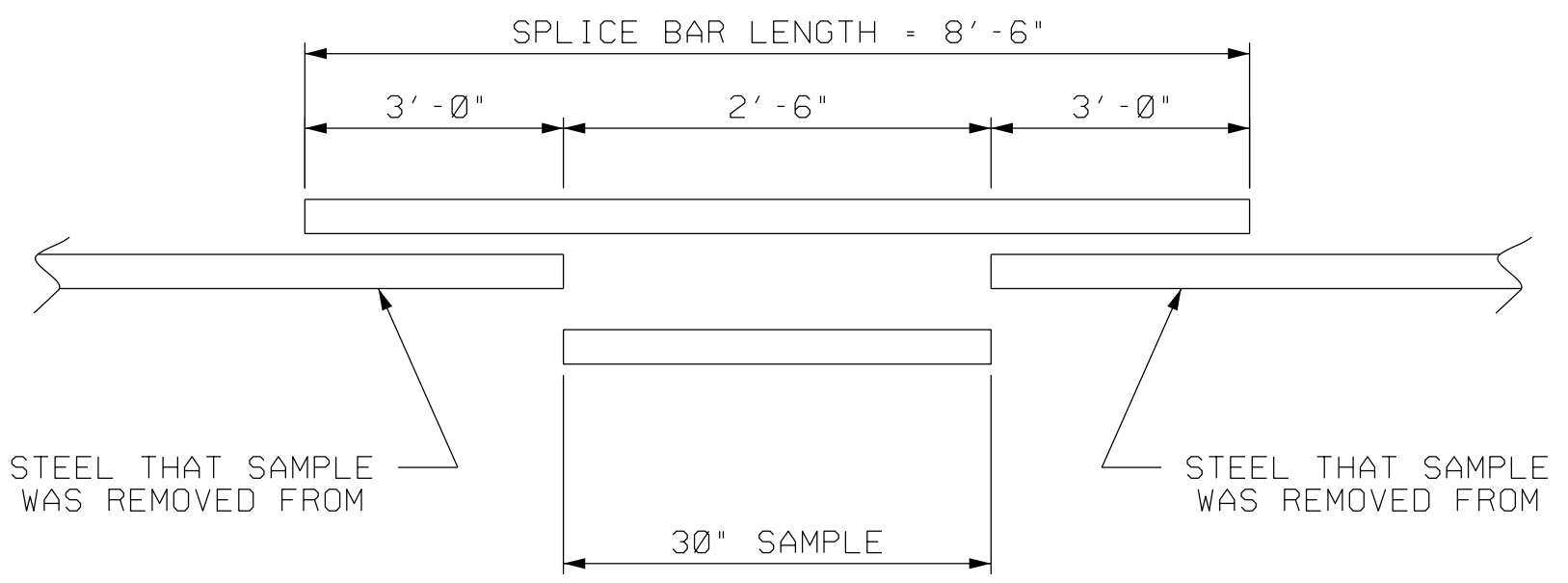
LENGTH OF STORAGE

CONTRACTOR

OTHER COMMENTS

STATE OF NORTH CAROLINA SUBJECT _____ PROJECT _____ COUNTY _____
 DEPARTMENT OF TRANSPORTATION PREPARED BY _____ STATION _____
 DIVISION OF HIGHWAYS CHECKED BY _____ STR NO _____ SHEET _____ OF _____
 HIGHWAY BUILDING
 P. O. BOX 25201
 RALEIGH, NORTH CAROLINA 27611

EXAMPLE: FOR #5 UNCOATED BAR



EXAMPLE: FOR #9 UNCOATED BAR

