~~Owen Merritt~~
EWW 359
W Jones/R. Smith
Pt 21 84-465
Publicly Available

DuBose Steel, Inc.
P.O. Box 1098 • Roseboro, N.C. 28382
(919) 525-4161

August 13, 1984

NRC
ATTN: Ed Baker
EWS-358
Washington DC

SUBJECT: Possivle Material Defects Reportable Under 10CFR21
Follow-up

Please find attached, three letters, referencing material sold you and reported to you in May 1984 as a possible 10CFR21 reportable defect.

Based on the information contained in these letters we would like to consider this possible reportable item closed.

Should there be any problem with this action please contact me at DuBose Steel Inc.

James Dailey
Quality Assurance Manager

IE19

Northwestern Steel and Wire Company
121 WALLACE STREET • STERLING, ILLINOIS 61081
Telephone 815/625-2500 • TWX 910-642-3894

August 9, 1984

Mr. Jim Daley
DUBOSE STEEL
P. O. Box 1098
Roseboro, North Carolina 28382

Dear Jim:

In hopes of finalizing the alleged 10CFR21 violation reported by Daniel International, I offer the following.

You have received our report from an independent testing lab with which I wholeheartedly agree. Tests were made during and after rolling 6" beam which I was sure were correct at the time and the lab statement verifies my point.

If I can be of any further service, please contact my office.

Very truly yours,

NORTHWESTERN STEEL AND WIRE COMPANY

C. R. Wise

C. R. Wise
Supt. Inspection & Quality Assurance

CRW:dmf

HANSON ENGINEERS
INCORPORATED

August 3, 1984

Mr. Gerald T. Shinville
General Superintendent - Metallurgy
Northwestern Steel and Wire Company
121 Wallace Street
Sterling, IL 61081

Attention: Mr. Gerald T. Shinville
General Superintendent - Metallurgy

Re: Investigation of W6X20 and W6X25
Heat Nos. 67151, 77052, 80551, and 89728

Gentlemen:

Please consider this letter as the report of our investigation of a potential problem with W6X20 and W6X25 wide flange beams rolled by Northwestern Steel and Wire Company from steel having the above heat numbers. Our investigation included a plant visit with a tour through the rolling mill, discussions with personnel from Northwestern, a review of file correspondence, examination of samples of the beams in question, and a review of applicable specifications.

Our review of the chemical analysis and the tensile tests indicates that the W6X20 and W6X25 sections rolled from the above heat numbered steel meets the requirements of ASTM A36 - Standard Specification for Structural Steel.

We were given samples of the beams and after removing the paint, each sample was measured with a micrometer and weighed. All of the samples meet the requirements of ASTM A6 - Standard Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use. We determined the weight was within allowable tolerances and believe the paint may have previously caused the beams to exceed weight tolerances.

We have investigated the beams with respect to requirements of the American Institute of Steel Construction. All requirements of AISC that can be objectively determined through measurements, weighing or testing have been met by the samples we inspected.

It has come to our attention that one item in the AISC Code of Standard Practice could be interpreted to not have been met. The second Paragraph of Section 6.4.3 states

> "Completed members should be free from twists, bends and open joints. Sharp kinks or beads are cause for rejection of material."

The determination of whether the beams in question meet this requirement is subjective. We believe the samples of the beams we inspected meet this requirement.

We understand the shallow fillet condition is a result of the rolling process and that exact uniform fillet size cannot be maintained. Rolled beams without fillets are also not the norm and they must continually be checked during their rolling to eliminate problems. We call your attention to Section 5.1.2 in the Commentary on the AISC Code of Standard Practice. It is located on page 5-196 of the AISC Manual. A copy is also enclosed. As indicated there, we as structural engineers recognize variation in cross section geometry and understand that our design equations also reflect that variation. When abnormal conditions are found, they must be investigated to determine their cause and consequence and whether they fit into the normal variation.

We conclude that the cause of the shallow fillet is in the rolling process and occurred during rolling of the W6X20 beams from heat numbers 77052 and 80551. We find no problem nor discrepancy between the ASTM A36 specifications and the chemical analysis and tensile tests performed on the steel of these two heat numbers. Therefore, no reasons have been found to reject the steel itself and other member sizes rolled from that same steel, after passing normal inspection procedures, would be structurally acceptable.

Structurally, the disadvantage of the shallow fillet would be an increased stress concentration at that point. The tranfser of stress from the flange to the web through the fillet areas will occur in a sharper manner because of the lack of a full fillet. In these W6X20 beams this would be considered critical only if it caused yielding to occur at that location before yielding would occur at the outside of the flange where it theoretically would occur first.

Northwestern Steel and Wire Company August 3, 1984

It is our opinion that the shallow fillet is minor and that because the yield point of the steel is over 30% higher than required, the W6X20 wide flange sections would perform satisfactorily under normal loading conditions for the design life of the structure.

Please call at your convenience if we can answer any questions or be of further service.

Very truly yours,

HANSON ENGINEERS INCORPORATED

Phillip E. Borrowman

Phillip E. Borrowman, P.E., S.E.
Associate Partner

PEB:lw

Enclosure

HANSON ENGINEERS

SECTION 4 SHOP AND ERECTION DRAWINGS

4.2 Approval

4.2.1 In those instances where a fabricator develops the detail configuration of connections during the preparation of shop drawings, he does not thereby become responsible for the design of that part of the overall structure. The Engineer-of-Record has the final and total responsibility for the adequacy and safety of a structure, and is the only individual who has all the information necessary to evaluate the total impact of the connection details on the structural design. The structural steel fabricator is in no position to accept such design responsibility, for two practical reasons:

(a) The structural steel plans may be released for construction with incomplete or preliminary member reaction data, forcing a review by the Engineer at the time of approval.

(b) Few fabricators have engineers registered in all of the states in which they do business.

In practice, the fabricator develops connection details which satisfy two basic criteria:

(a) The connections must be of suitable strength and rigidity to meet the design requirements.

(b) The detail configuration accommodates the fabricator's shop equipment and procedures.

Since each shop has different equipment and skills, the fabricator is best suited to develop connection details which satisfy the second requirement. However, the overriding first requirement necessitates acceptance of responsibility and approval by the Engineer.

SECTION 5 MATERIALS

5.1 Mill Materials

5.1.2 Mill dimensional tolerances are completely set forth as part of ASTM Specification A6. Variation in cross section geometry of rolled members must be recognized by the designer, the fabricator and erector. (See Fig. 1.) Such tolerances are mandatory because roll wear, thermal distortions of the hot cross section immediately after leaving the forming rolls, and differential cooling distortions that take place on the cooling beds are economically beyond precise control. Absolute perfection of cross section geometry is not of structural significance and, if the tolerances are recognized and provided for, also not of architectural significance. ASTM A6 also stipulates straightness and camber tolerances which are adequate for most conventional construction; however, these characteristics may be con-

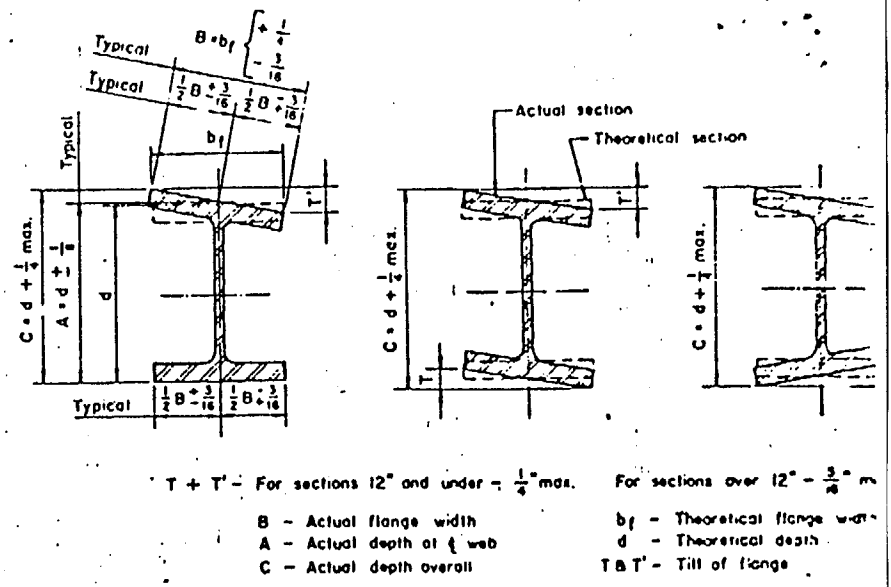

Fig. 1. Mill tolerances on cross section dimensions

SECTION 6 FABRICATION AND DELIVERY

6.4 Dimensional Tolerances

Fabrication tolerances are stipulated in several specification document applicable to a special area of construction. Basic fabrication toleran stipulated in Sects. 6.4 and 10 of the Code and Sect. 1.23.8.1 of the AISC S cation. Other specifications and codes frequently incorporated by refer the contract documents are the AWS *Structural Welding Code* and AA *Standard Specifications for Highway Bridges.*

6.5 Shop Painting

6.5.2, 6.5.3 The selection of a paint system is a design decision involvin factors, including owner's preference, service life of the structure, severit vironmental exposure, the cost of both initial application and future re and the compatibility of the various components comprising the paint s i.e., surface preparation, prime coat and subsequent coats.

Because inspection of shop painting needs to be concerned with work at each stage of the operation, the fabricator provides notice of the sche operations and affords access to the work site to inspectors. Inspection n coordinated with that schedule in such a way as to avoid delay of the sch operations.

Acceptance of the prepared surface must be made prior to applicatio prime coat, because the degree of surface preparation cannot be rea