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STRUCTURAL ENGINEERING

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Jeff Haugen
Haugen Enterprises
1851 Heartland Avenue
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October 22, 2012

RE: Swivel Crane Hook Rating (Model #MFSH-14)

Sandman Consulting PC (SCPC) was retained to rate the Swivel Crane Hook hoist produced by Haugen Enterprises in Casselton, ND. The hoist was supplied to SCPC to perform a structural analysis and verify the load rating. See attachment #1 for a picture of the hoist.

Field Verifications

The hoist consists of a pair of HSS 8x4x$^3/_{16}$ tubes to accept the forks. These tubes are bridged by a HSS 4x4x$^3/_{16}$ tube that has a length of 2'-6". Beneath the HSS 4x4x$^3/_{16}$ tube are (2) ½" plates spanning between the fork tubes. A 1" diameter Grade 8 bolt passes through both plates. The threads of the bolt are included in the shear path. The bolt supports a pipe sleeve and a 14,000 pound Crosby hook. The pipe sleeve has an outside diameter of 1½" and a wall thickness of ¼". The pipe sleeve material has a yield strength of 75 ksi based on the mill certification from McNeilus Steel.

Conclusions

All capacities stated below are based on a factor of safety of two against yielding of the steel. The bolt shear strength is 23.6 kips. The bolt bearing capacity on the ½" plate based on the 2" edge distance is 25.5 kips. The weld capacity of the plate to the tube directly above the hook is 14.8 kips. The capacity of the pipe sleeve is 14.7 kips which is controlled by a point load at mid-span. The capacity of the HSS 4x4x$^3/_{16}$ tube is 15.3 kips which is controlled by a point load at mid-span.

Based on the capacities above the load rating tag on the hoist of 14,000 lbs is sufficient. The hoist must be level when lifting a load as to not apply any horizontal forces to the system.

SCPC appreciates the opportunity to provide this evaluation. SCPC shall be held free of any and all liability with respect to unapproved changes in the hoist's condition. Any damage, or applied loads outside of these ratings after the time of rating evaluation, will have detrimental effects on the performance of the hoist. Additionally, SCPC shall be released from any and all liability if such loading

occurs. It is recommended this hoist be visually inspected for damage prior to each use. If you have any questions or need clarifications, please feel free to call at any time.

Thank you,

Justin Schoenberg, EIT
Project Engineer

Kurt Sandman, PE (ND PE# 4797)
Owner Principal

Att: Attachment 1

Cc: File

ATTACHMENT #1

Swivel Crane Hook hoist