Material Specifications - Steel Yield & Ultimate Strength

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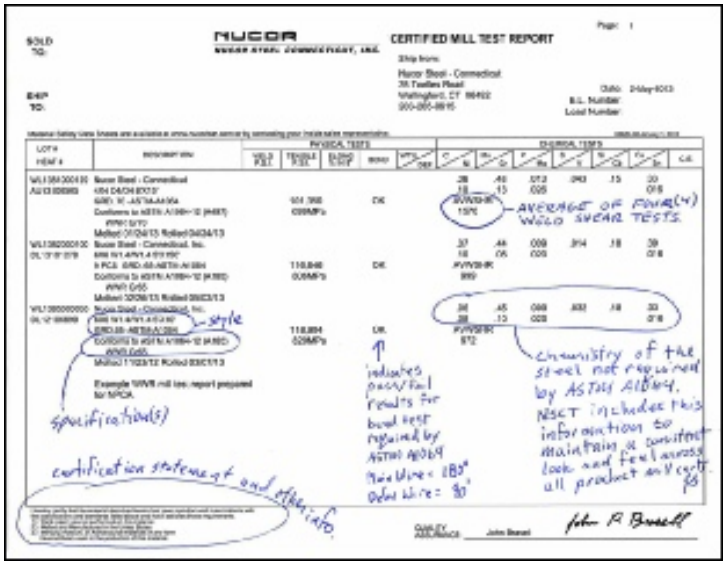
NUCOR
CERTIFIED MILL TEST REPORT
Nucor Steel - Connecticut
AVERAGE OF FOUR(4) WELD SHEAR TESTS.
specification(s)
certification statement and other info.
indicates supplemental results for bend test required by ASTM A1064
Chemistry of the steel not required by ASTM A1064. NSCT includes this information to maintain a consistent look and feel across all product and certs.

In the last several months, we at CTL|Thompson (www.ctlthompson.com) have written a few articles about steel issues as they relate to helical pile design and the value of effective quality assurance procedures. At this point, we have to acknowledge that these tidbits of information come about as a result of our interaction with International Code Council – Evaluation Services (ICC-ES). Although the testing and approval process can be lengthy and painful at times, we give ICC-ES (www.icc-es.org) credit for making sure we are all running a tight ship. Remember, helical pile manufacturers came together and formed the Ad Hoc Committee ten or so years ago in an effort to develop testing and quality control standards to comply with the ICC-ES certification process. As the gatekeepers to the land of those coveted certificates that assure product credibility, we must give ICC-ES credit for upholding the standards that many manufacturers are striving to achieve.

As for the latest tidbit of information, we want to focus on a potential problem associated with steel strengths and mill certs. When calculating the structural capacity of the pile, a designer is basing those calculations on the published value at that type and grade of steel (e.g. ASTM A53). Those grades are well established and can be referenced in several different manuals. Other types of steel may have higher or lower strengths. As suppliers provide those materials with higher strengths, the natural inclination is to increase design capacity. That is all fine, until that supply of higher strength runs out. If it runs out, will you change your design capacity? Will you find a new supplier? Will you forget to do anything? No one will know, until a third party auditor arrives and asks to see all of your mill certs. It would be a bad day when Mr. Inspector informs you that the last month of production is jeopardized because you used lower strength steel that is different from the material specification described in the ICC-ES evaluation report (ESR) and in your Quality Manual. In order to correct and rectify this problem, these little tidbits will require the report holder to contact ICC-ES to inform them of this change in material specifications. ICC-ES will then conduct a technical review which for sure will result in Quality Manual changes, more Lab and field testing and a new revised ICC-ES report with reduced design capacity.

Hypothetical #1

Flimsy Pier Company (FPC) buys their round stock from Oblong Pipe Inc (OPI). OPI sells their material as ASTM A53, Grade B (which has a minimum yield stress of 35 ksi), but their processes are so good that they are always achieving 60 ksi. Mill certs support those values, so FPC designs their piers using the 60 ksi value. On January 1, 2014, OPI replaced their quality control guru with a computerized system. Now the yield stresses are bouncing around between 35 ksi and 75 ksi. OPI reflects those values on the mill certs, and calls ahead to let FPC designers to know about the loss in capacity. What does FPC do? Reduce the value of their piers? Try to find a new supplier?

Hypothetical #2

Let's assume that all of the above is true, but that OPI is not forthcoming with their quality issues. They don't let FPC know about the variability since they are still meeting the requirements of A53, Grade B steel. Does anyone in FPC's receiving group check the mill certs to verify the strength of the received material?

In conclusion, in order to avoid the heavy cost of these little tidbits (Q.M changes, Lab & Field testing cost, time, etc…), the manufacturer should carefully choose the material specifications (yield and ultimate strength) based on its common availability before starting his journey for an ICC-ES report request.

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