

Example of the Process-Audit Approach...

In preparing for an internal audit of production, internal auditors at a steel mill reviewed recent customer feedback.

While reviewing the feedback it was noted that a customer's stamping plant reported that parts stamped out of a coil that was received from the mill exhibited a nonconforming condition referred to as "orange-peel" or dimpling.

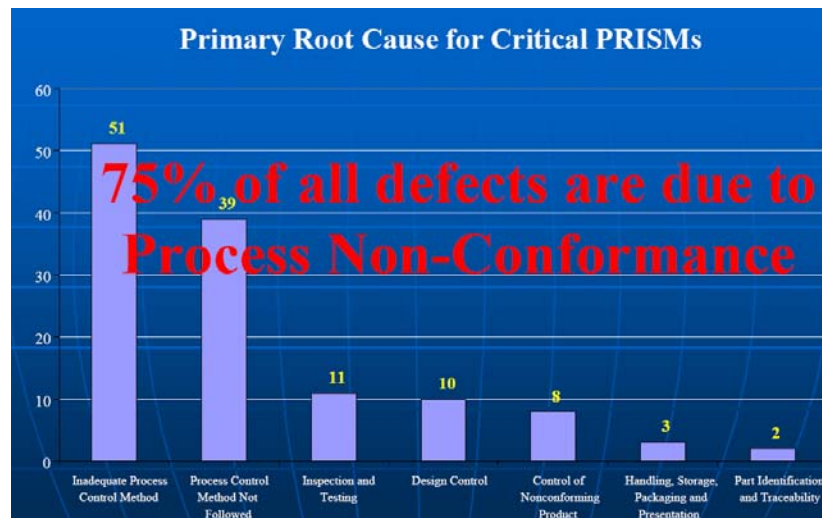
A search of the organization's knowledge base and interviews with subject-matter-experts revealed that this condition is often the result of the metal coil being over-annealed.

In the annealing process several coils are stacked, usually 3, and then baked. Oven-temperature and bake-time process parameters are established based in-part on the level of carbon content in the steel. The higher the carbon content of the metal coil, the higher the temperature and the longer the bake time.

Following the process-audit approach, the steel mill's internal auditors drilled down into the annealing process and traced the records for the coil that was shipped to the customer's stamping plant. After examining the records they verified that that the low-carbon content coil that was shipped was annealed with two high-carbon content coils and that the bake time process parameters were selected based on the high-carbon content coils, resulting in the over-annealing of the coil sent to the customer.

The internal auditors then reviewed the process documentation to determine whether "orange-peel" was identified as a 'potential failure mode'. It was verified that orange-peel was not identified as a potential failure mode. Proceeding on, the auditors then reviewed the control plan and Annealing Work Instructions to determine whether a control was identified to ensure that low-carbon content coils are not stacked with high-carbon content steel prior to the annealing process. The auditors verified that there were no such controls noted on the control plan or the Annealing Work Instructions.

The root cause was determined to be 'inadequate process control method' – #1 Root Cause of all defects!



Scott R. Garberding, Vice President Supplier Quality DaimlerChrysler Corporation, reported in *The Fifth Dimension: the Supplier & OEM Interface*, that "75% of all defects are due to process non-conformance" – 42% due to *Inadequate Process Control Method* and 33% due to *Process Control Method Not Followed*.