

Testing For Correct Heat Treatment (Intermediate Structure) Of Austempered **Safety Bolts**

Testing of austempered safety bolts (intermediate tempering)

The parts to be tested here are components for safety belt lockings used in automotive industry. Malfunction of such locking bolts may cause the safety belt to open during an accident and lead to severe injuries of the passengers. A concept had to be developed to ensure that not one single "bad" bolt will be used.

Possible defects are mix-up of hardened and unhardened parts as well as of parts slightly exceeding or falling below hardness limits. Furthermore, the bolts might be hardened differently, ie. on one side they are within hardening limits, on the other side outside. This phenomenon may not be detected with conventional hardness testing if the parts are by chance always tested at a "hard" spot.

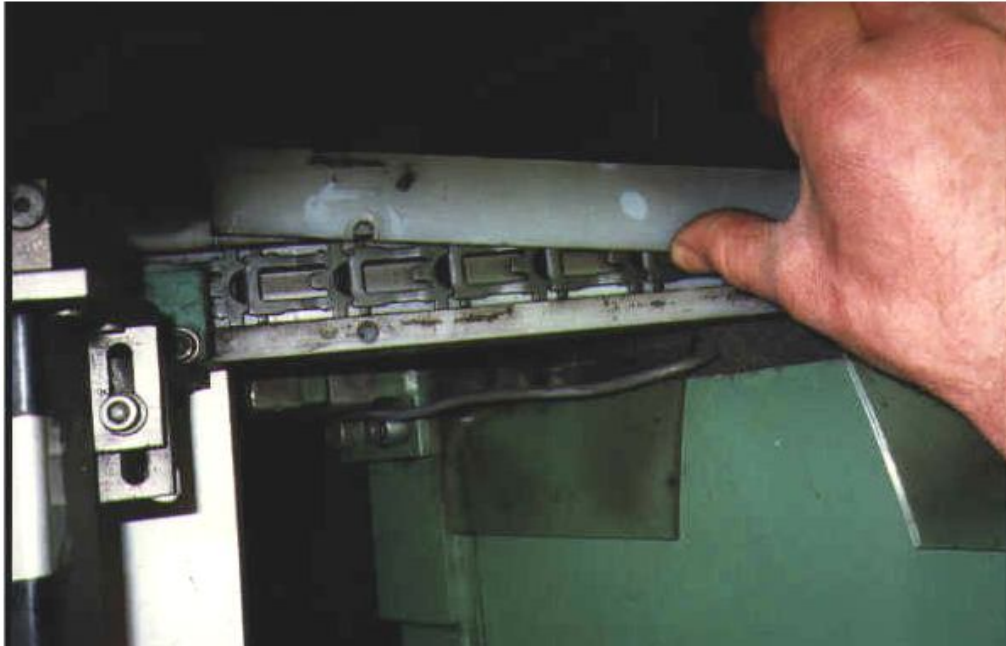
*This problem was solved with the 100% sort system for safety bolts described here. The parts are separated in a vibration feeder first and then led through an eddy current encircling coil one by one. The subsequent test with an **eddyliner**[®] makes sure that no faulty parts will be delivered.*

The non-destructive hardness test system was integrated in an existing dimension control machine. The complete sort system including test coil and stopper was designed by ibg so that integration was made by the customer, Messrs. Vogelsang in Hagen.

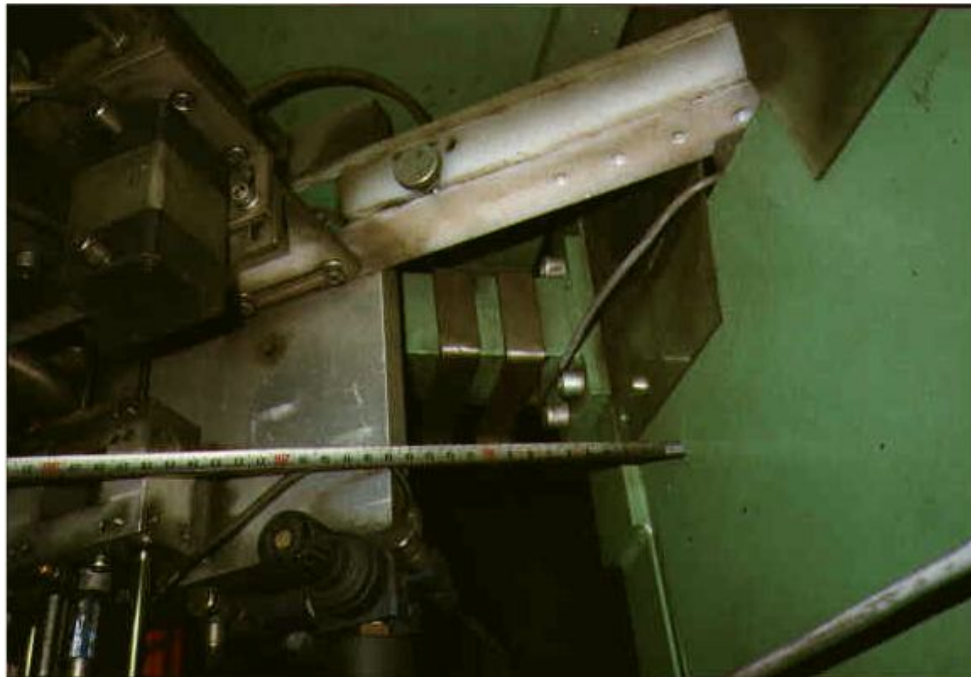
The test unit has been in use since July 1992, and more than 10 million parts have been tested in T3-shift-operation without problems.

In a special product audit the system described above was audited and accepted by the final customer, Messrs. Autoliv, Klippan. Eddy current hardness testing and multi-frequency testing have been admitted to be the only reliable method.

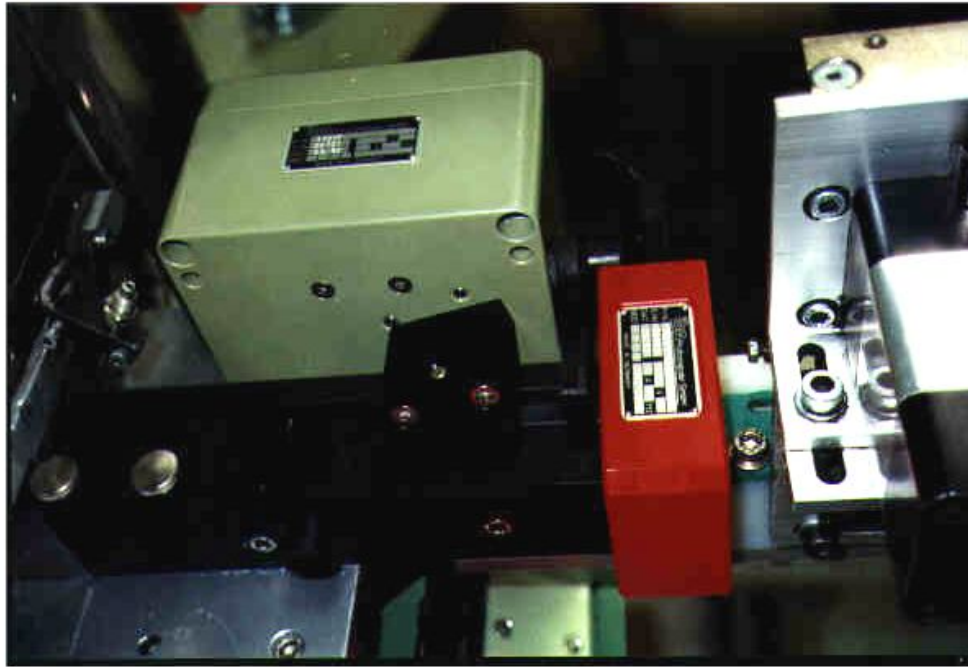
- safety part (safety belt)
- 3600 parts/hour
- testing with **eddyliner**[®] plus Option 01
- sorting for O.K. / NOT O.K.



Integration of material testing prior to dimensional control



Test coil with stopper and sorting rail



Dimensional control subsequent to material testing

