

## Casing Wear Testing

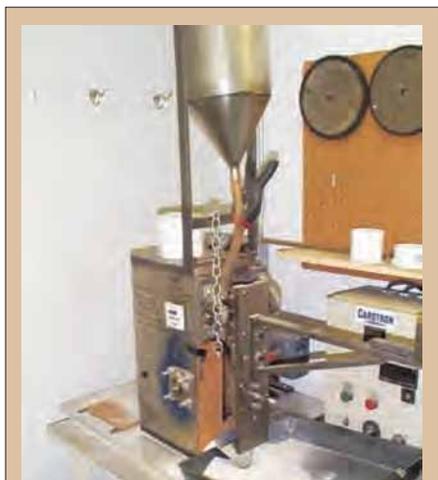
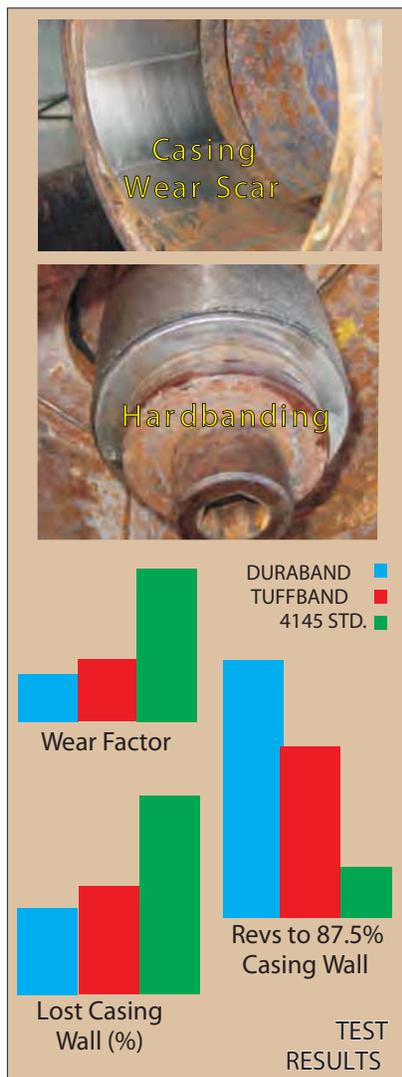
How is a hardbanding rated as being “Casing Friendly”? Typically this is done in a special testing apparatus which utilizes a section of casing and an actual tool joint with hardbanding. There are a number of such devices around the world, but one of the most popular is owned by Mohr Engineering, Houston, TX. This equipment was owned previously by Maurer Engineering.

The test consists of rotating a hardbanded tool joint at 155 RPM in a N80 Casing with a side thrust load of 3000 lbs. for 8 hrs. Periodically, the test is stopped and the wear scar geometry is measured. At the end of the 8 hour test the data is plotted and curve fitted. A number of very valuable parameters are derived that help describe the effects of a certain hardbanding on casing wear. One of these is the “Wear Factor”, in which very low numbers are desirable. Another is the percentage of casing worn in 8 hrs. Again, low numbers are desirable. Another is the number of revolutions required to remove 12.5% of casing. Higher numbers are desirable.

Since Mohr Engineering acquired the equipment, a number of parameters have changed, making comparisons to older data misleading, such as the study (DEA 42) carried out by the Drilling Engineers Assoc. in the year 2000. For example, two very important parameters used as a standard, AISI 4145 Unbanded Tool Joint, have changed dramatically as shown below.

4145 Bare Tool Joint		
Parameter/Year	2005	2007
Wear Factor (E-10/psi)	5.5	7.4
%Casing Wear	17.3	25.6

Currently, the API is working to standardize the test, making it much more reliable, repeatable and time worthy. Meanwhile, the industry continues to rely on this data to evaluate hardbanding effects and plan drilling operations. The test data for Postle’s products that have subjected to this test can be made available to interested parties by contacting our office.



## Abrasive Wear Testing

The ASTM G65 Dry Sand Rubber Wheel Abrasion Test is an abrasion test that closely duplicates real world drilling conditions because of the use of sand, which is what most of the earth is made up of.

A (1”x3” x wall thickness) hardbanding is subjected to a rotating steel wheel which is coated with rubber. A constant load of 30 lbs is applied. The test is run for 2000 revolutions, and the original and final sample weights are compared. The specification calls for weight losses to be reported in volume, but if all test samples are steel alloys, the results are reported in weight lost. Low numbers are the most desirable.

### G65 Abrasion Test Results

Duraband<sup>®</sup> 0.16 to 0.20  
 Tuffband<sup>®</sup> 1.25 to 1.50  
 Ultraband™ 0.40 to 0.45

