

Operator skills and brand characteristic keep knives sharp

A trial run by B.E. Campbell and Knife Grinders has established that operator skill and the brand of knife are key factors in retaining a sharp knife edge in a boning room environment.

The primary purpose of the trial was to optimise knife sharpness with a view to improving worker satisfaction, health and safety – specifically repetitive strain injury. Sharp knives also increase throughput and improve product quality and presentation. The trial also identified the characteristics of the best value for money knives in terms of cost, service life and maintenance.

The trial was initiated by Alex Campbell, Chief Operating Officer of B.E Campbell, and run at their plant at Wetherill Park, in Sydney's west. Knife Grinders, who are licensed to supply

BESS sharpness testers in Australia and New Zealand, supplied the testers and co-designed the trial that ran for one week. It was the first of its type in Australia. The objective of the trial was to measure knife sharpness over time and then identify the factors that determined and influenced sharpness.

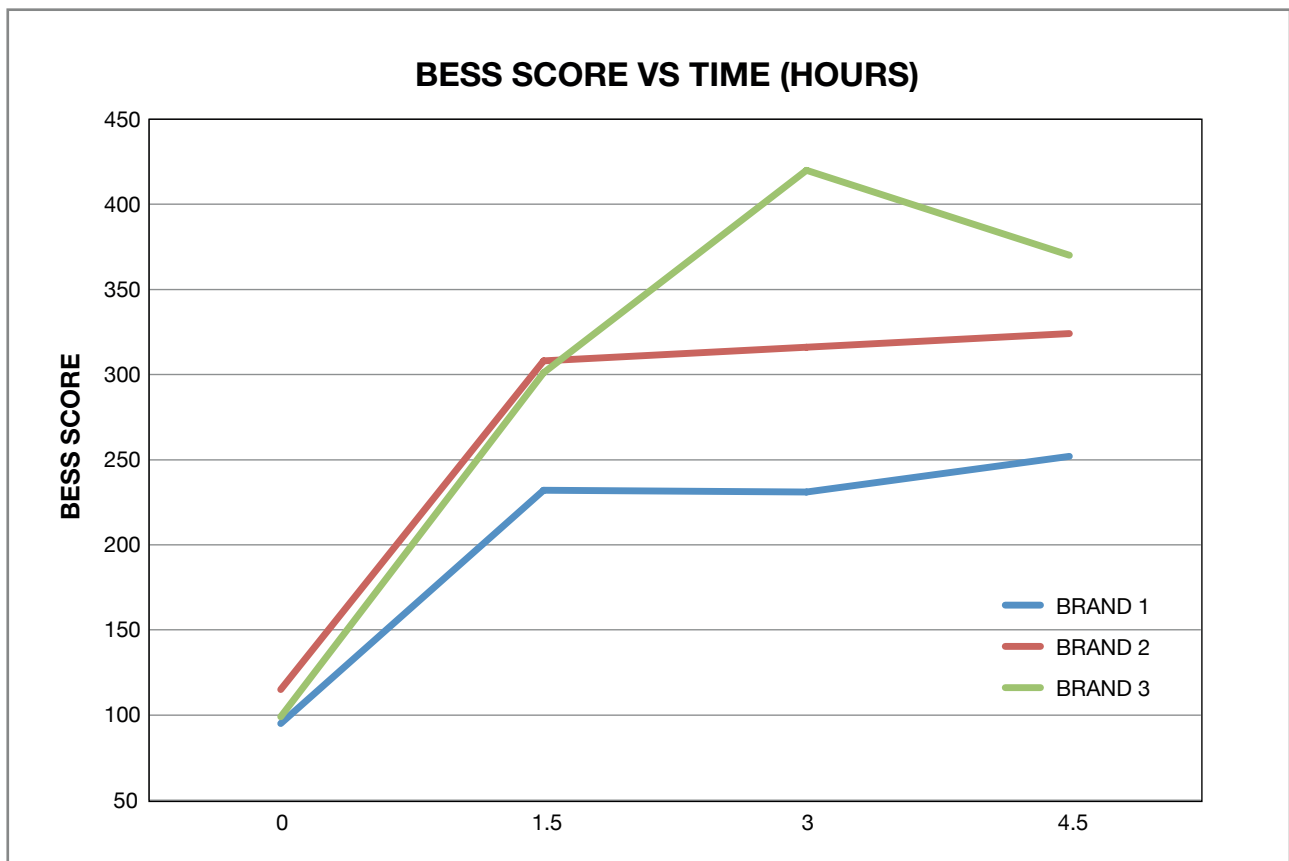
Sharpness was measured using a BESS edge sharpness tester. BESS is an acronym for Brubacher Edge Sharpness Scale, an international standard to numerically quantify sharpness.

BESS-calibrated edge sharpness testers measure edge apex radius in

nanometers (nm), (1nm = 1 billionth of a metre). Safety razors score 50 BESS and have a 50nm apex radius. Like golf, the lower the score the sharper the edge. A sharp knife has a BESS score from 100 to 300 and a dull knife scores over 500 BESS.

In the trial nine boning room operators used three brands of knives. Knife sharpness was measured every 1.5 hours. To allow for different operator skill, all operators used each brand of knife. Knife brands and operator were recorded throughout the trial.

Operators used a steel to touch-up their knives as was their normal



practice. Operators were instructed not to steel their knives immediately before sharpness testing. This allowed the trial to establish more precisely the “average” condition of the blade.

Comparing Knives

The chart (see opposite) shows the pattern of sharpness loss for the three brands evaluated. Brand 1 and 2 showed sharpness loss in the first hour then remained consistent for the following three hours. Brand 3 continued to lose sharpness.

The data shows improvement in the sharpness of Brand 3 after three hours use. This “improvement” was attributed to more frequent steeling by operators who were aware of the need to steel more frequently to maintain sharpness.

The trial showed that Brand 3 steel is softer, so that not only the apex fades, but the whole edge deteriorates more quickly with use.

Comparing Operators

Sharpness Score by Operator Skill level table (below) shows that Grade 5 operators manage to keep their knives much sharper than Grade 3 operators. The result was consistent for both the better Brand 2 knives and the poorer Brand 3 knives. Grade 5 operators were recognised by their peers as good operators.

The results show that more skilled operators were able to maintain

sharpness for longer with both the better and not so good knives. On the other hand, less skilled operators experienced a loss of sharpness more quickly with both brands of knives.

Reflecting on this observation, objectively measuring sharpness reflects or correlates with the skill of an operator and could be a useful training tool.

Plain or Fluted

Alex Campbell has been considering using fluted knives for boning. A short trial found that this was not a good idea.

Fluted (scalloped Blade) vs Plain Blade	
Average Sharpness*	
Fluted 363	Plain 276
* This is the sum of the sharpness scores divided by the number of measurements.	

The data shows the brand and style of fluted/scalloped knives being considered for use had poorer edge retention than the knives currently being used for boning.

This trial only considered one aspect of one brand of knife. This brand had shallow scallops that did not extend to the cutting edge and were relatively stiff compared to the boning knives

Sharpness Score*** by Operator Skill level		
Knife ID	Grade 3* operator average sharpness	Grade 5** operator average sharpness
Brand 2a	343	187
Brand 3 b	555	361
* & ** Grade 5 operators were recognized as more skilled than Grade 3 operators. *** The sharpness score for a given brand is: the sum of the sharpness scores divided by the number of measurements for lower and higher skilled operators. a Brand 2 as above b Brand 3 as above		



currently in use. Though the specific brand of fluted knives tested did not show an advantage in boning, it may perform better in slicing. Further trials should clarify this point.

Now What?

In conclusion the trials showed that there are significant differences in the capacity of different knife brands to retain their sharpness. The trial also demonstrated that skilled operators can keep a knife sharp for longer, irrespective of the inherent quality of the knife itself.

B.E. Campbell plans to continue testing knife sharpness to ensure they buy and use the best fit-for-purpose and value-for-money knives. Knife Grinders will assist with planning and analysis. The next study will be run the B.E. Campbell facility in Young, NSW.

With a BESS tester, knives can be objectively evaluated using performance, safety and economic criteria as opposed to subjective criteria such as tradition, reputation and price.

Knife sharpness tests can also be used as a measure of operator skills. Clearly operators whose techniques maintain sharpness and productivity have skills that should be identified and shared across the workforce. ■