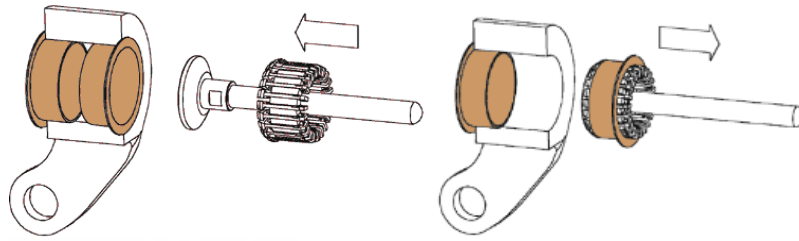


'BushOut' cuts bush removal time from hours to minutes!



One of the biggest costs in maintenance is the removal of bearings, bushes and liners. First there is the cost of extensive downtime and the associated manual labour. Then there is the hassle of mobilising the tools to do the job. Finally, there is always the risk that removal will cause some secondary damage, so you could be looking at a hefty repair or replacement bill as well. But Hanley Smith Ltd has the answer to these problems in the form of the new BushOut System.

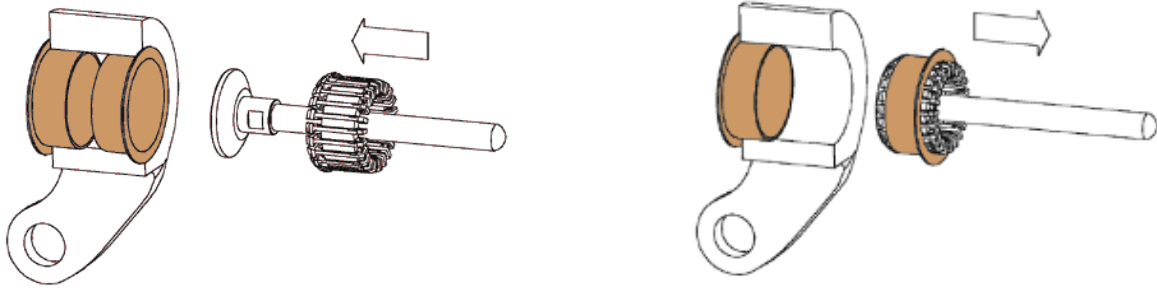
Five years in development, the Hanley Smith BushOut is a flexible system specifically designed to ease the removal of bearings, bushes and liners. Suitable for use both in the workshop and in the field, it can be adjusted to fit the bush with any diameter unlike standard extractors which are designed to be used with a given diameter and length of bush or liner. BushOut can extract bushes from both blind holes and non-blind holes. A take-anywhere, use-anywhere tool, it saves time, saves money and improves your productivity.

As well as simplifying bush and liner removal, the BushOut System also makes regular inspection feasible, allowing issues such as corrosion to be detected and addressed as part of routine, scheduled maintenance procedures. The BushOut has been designed to be as easy as possible to use. In a single-handed operation, the operator fits the extractor and pulls out the liner in minutes. There are no punches or drifts to be miss-hit or splintered. Also, by removing the stressing effects of low frequency heavy impacts, there are long term maintenance and repair benefits.

Fully portable, the BushOut System takes minimal time to mobilise, and enables much faster extraction of the bush or liner than found with conventional methods. The system avoids creating secondary damage, and so eliminates the need for the all-too-common secondary part replacement or repair cost and quality checks for damage.

As an example of how the BushOut System can save time, Hanley Smith points to the boring of a 747-nose axle, which can occupy a machine for up to eight hours. By contrast, using the BushOut System, both axle liners can be removed in just 11 minutes.

Principle of Operation



With bush removal the prime difficulty occurs when the bushes for removal are fitted back to back or if it is fitted in a blind hole giving no direct access to the rear.

The 'BushOut' is designed to easily remove bushes of variable sizes from 45 mm (1.7") to 100 mm (4.0") diameter bore. The flexibility stems from the customers ability to configure and re-configure numbers of elements to fit the bush identified for removal.

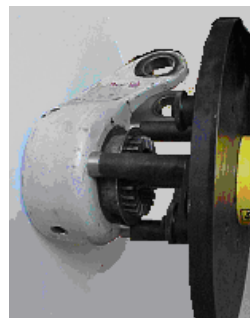
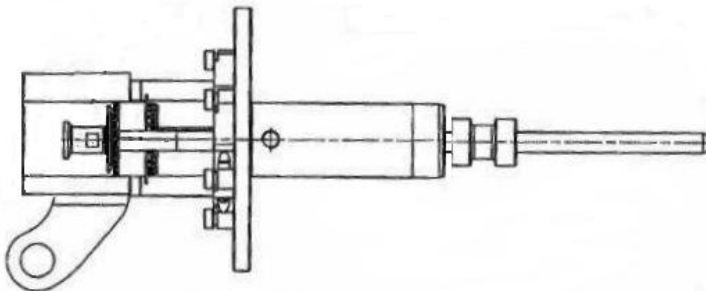


Elements partially assembled

The basis of the 'BushOut' kit is a system of elements that interlock providing a ring that can be compressed to enter the bush and then expand so the tips (nibs) of the fingers engage behind the bush. The neoprene enables the assembled collet to be compressed in diameter to enter the bush and when pushed through the bush expand it to bed the nibs at the rear end of the bush. A selection of pressure plates are designed with a matching contact angle transferring the extraction force evenly to the elements..

Extracting Bushes

The 'BushOut' is designed to be used with a hydraulic ram to pull the bush from the housing



Pulling out a bush using the Hydraulic Cylinder system

6 steps using the 'BushOut' extracting trunnion bushes from a 737 nose leg



1 'BushOut' kit parts used to pull out the bush



2 Measuring the internal bore of a bush.



3 Selecting the appropriate pressure plate.



4 Assemble the tooling into the bush compressing the collet sliding it in until it expands locating the nibs behind the bush.



5 The removal assembly positioned ready to pull out the bush.



6 Operating the pump pulls out the bush

The **Hanley Smith** 'BushOut' Kit is now being widely used removing bushes from undercarriages and wing assemblies' worldwide.