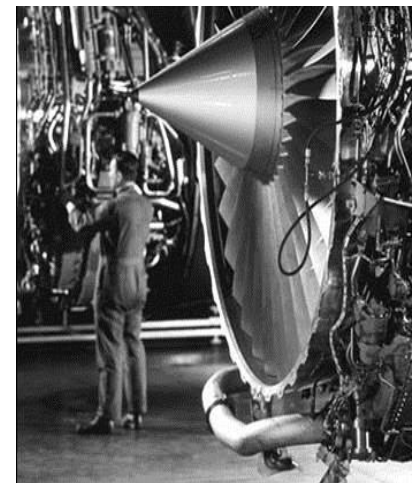


METALS MANUFACTURING (USA)

AEROSPACE

Castrol Syntilo® 9954

ANNUAL SAVINGS: \$877,171



THE SITUATION

A large aerospace engine customer had three plants using heavy duty chlorinated neat oils to broach a variety of difficult to machine alloys, including Hastelloy, Inconel, Rene, & various stainless steels. They wanted to avoid the disposal and environmental issues that are a part of using these traditional oils. They also wanted to improve the workplace environment, avoiding the mist and other health & safety issues.

BEFORE CHANGE

- Neat oil – various chlorinated oils
- RAM speed – <15 ft/min
- Stroke time – >45 seconds
- Issues with cleanliness and operator acceptance

AFTER CHANGE

- Syntilo 9954 @ 9%
- RAM speed – >35 ft/min
- Stroke time – <15 seconds
- Cleaner work area and reduced disposal costs

THE SOLUTION

- Castrol has many successful experiences changing horizontal and vertical broaches from neat oil to water based cutting fluids
- The customer wanted to experience the improved work environment and reduce disposal costs, as well as gain more throughput due to faster cut times.
- In all applications, the ram speed was increased to create the necessary heat for the lubricant properties of Syntilo 9954 to become effective.
- The increase in cutting speed resulted in greater part throughput and reduced cycle times.
- The broach life increased, providing more parts per regrind more uptime.

The customers wanted to take advantage of the latest technology and get away from traditional straight oil machining for broaching.

The water-based coolant success has been used repeatedly to bring substantial cost savings to customers. This technology transfer yields savings in tooling, increased throughput, decreased cycle times, and fewer tool changes.

RECOMMENDATIONS

Castrol's experience with broaching operations gave us the confidence that Syntilo 9954 could successfully perform the job with the difficult to broach material. The key was to have the freedom to employ the process changes (speed and tool modifications) to make the job a success.

"...the blades became dull too quickly, limiting production. By crunching data, (the solution determined) was to change the lubricant used in the process."

"We've been able to get so much more out of this factory and really produce like crazy."

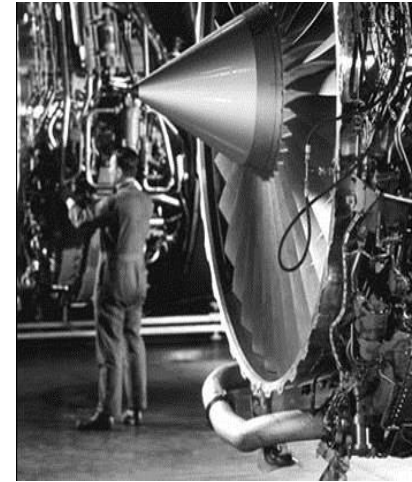
Excerpt from *Newsweek*, May 28, 2001

OFFER DETAILS

Our customer has many broaching machines throughout the three plants that converted from neat oil products to Syntilo 9954. Our solution to employ a "best practice" transfer to use Syntilo 9954 with the correct process parameters allowed them to have successful conversions throughout their facilities.

CONCLUSION

The reduction in cycle time, coolant usage costs, and waste costs has resulted in a huge savings across the 3 plants, totaling \$877,171. This made such an impact to the customer that the project was mentioned in a *Newsweek* article (see an excerpt below).



OTHER POTENTIAL APPLICATIONS

Syntilo 9954 has proven to be an extremely effective water-based coolant capable of replacing straight oils in the difficult and demanding operation of broaching. Castrol has been able to take these experiences and improve cycle times, increase tool life, and improve operator working conditions at many plants. These conversions have resulted in significant benefits for our customers.