

CANADIAN MACHINERY AND

metalWORKING

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Revved up
Canadian car makers
post record production

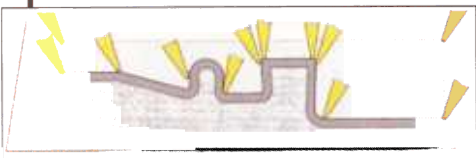
Laser trailblazers

Laser-cut hydroformed
SUV frames —
Budd Canada blazes trail



Optical profile grinding is on its way

During a recent visit to Switzerland, a newly found supplier demonstrated—what I think are—phenomenal innovations in Optical Profile Grinding (OPG) with CNC controls. This is an update to pass on to form grinders who exclusively rely upon mylars, templates and diaform dressers. CNC OPG is very exciting as it can eliminate all of the above and still make use of the high-speed, reciprocating, hydraulic axis to generate both straight and even logarithmic relief on specialty form cutters (see samples below).



Both straight and even logarithmic relief can be generated with OPG.

Historically, OPG was used in the screw-machine industry to generate dovetail form tools. Many toolmakers will argue that wire EDM has eliminated the need for optical form grinding, but this is not the case. To generate small inside radii, particularly in anti-lock braking systems and the fuel injection applications, these specialty form cutters require similar inside radii, only achievable through articulated OPG (see wheel profiling path and resultant part photos adjacent). It is now possible to manufacture these formerly complex forms by importing a DXF file to the OPG and hitting go!

The bearing industry also requires OPG, especially for circular form cutters. These cutters are best gener-

ated with OPG, again allowing smooth radial finishes as well as small inside radii.

The automotive and aerospace industries actively take advantage of OPG for crush form rolls manufacturing and form maintenance. Today, crush form rolls are easily maintained under CNC OPG with tight inside radii of 0.005-in. or better.

The punch industry probably has one of the greatest requirements for OPG, whereby longitudinal form grinding is achieved on surface grinders with overhead optical form dressers. The traditional method of grinding is troublesome because it uses form wheels sculpted from conventional abrasives. These forms break down very quickly and require multiple dress and grind cycles and tremendous labour input

with highly skilled technicians.

Today, the same type of grinding uses an enduring 1V1-form superabrasive wheel. These superabrasive wheels rely upon a single point of contact to generate the complete form and simply require a radial programming offset as the diameter breaks down. As a result this wheel can be used for many cutters without necessitating any dressing. Most importantly, automating this process with preset pallets for the punches is possible. These pallets allow for radial and axial offsets in the punch blank, much like EDM electrodes in a tool changer. A further step towards lights-out automation is possible with auto loading systems for the punch pallets.

OPG is also very practical for the high-precision form gear-cutting industry. When it comes to gear cutters, they are typically generated with arithmetic relief throughout the profile cross section. In the case of OPG, one manufacturer has integrated a high-resolution linear drive system with an ultra-precise Lehman indexer; the result is the ability to generate form relief with a true logarithmic profile that no longer develops inconsistent profiles upon regrind.

As can be seen by its pervasive infiltration of most metalworking sectors, Optical Profile Grinding is definitely here to stay... please do not ignore its significance! CMM



Parts with small inside radii made with articulated OPG.



Wheel Profiling path

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