Quick change
for vertical lathes
Vertical turning lathes, or VTLs, are one of the most traditional machine types, table diameters range from 1m to over 20m. A gantry design with a RAM has been the base of construction.

When machining they have always delivered very high metal cutting efficiency however the machine utilization can be restricted by tool change time, measuring and component loading and unloading.

The need for large machines to machine concentric components has been revived over the last decade with the increase in energy and transportation demands. Gas, steam and wind turbines as well as aero engines all require large components with turning operations to be carried out. Railway wheel production has also seen a dramatic rise in quantities for freight as well as new inner city and high speed passenger lines.
Machine development

Development to a new generation of multi functional machine has been driven by several technologies:

- Pre-measuring outside the machine to reduce set up time similar to machining centers
  - Quick change – machines equipped with turning blocks can be equipped with manual quick change units. Providing change of the tool holder in a minute with high accuracy and coolant internally directed
  - Automatic tool change – with hydro mechanical clamping units the tools are changed automatically allowing ‘Green Light Production’

- Rotating spindles – different attachments are mounted on the front of the RAM. The main milling spindle in the center of the RAM can drive a 90deg head providing a 4 axis machining center which prevents the moving of large components which is both time and labor intensive

- Tool magazines - space for more tools, due to more operations being carried out and more complex parts, is being provided by chain magazines similar to large machining centers or multi-task machines rather than the traditional disc storage

High pressure coolant (HPC) – Piping the coolant through the RAM means there are no moving parts to provide sealing headaches (like rotating spindles and turrets). 70 bars is now the norm with 200bar being used in difficult to break materials.

High pressure coolant systems combined with dedicated tooling eliminates coolant pipe setting and long chips ‘bird nesting’ around tools and ‘bailing’ in the conveyor - removing a high percentage of machine stoppages.
Quick Change
– Coromant Capto®

**Automatic Tool Change**
Automatic tool change ensures best machine utilization. Coromant Capto is the natural choice for turning operations and is also available for the rotating spindles with the same coupling size. The number of heavy shank tool attachments is drastically reduced and a common magazine provides complete flexibility allowing any combination of turning, milling, drilling and boring tools to be used with the same tool changer.

**Manual Quick Change**
The time to change shank tools on the machine or tool blocks in and out of the machine is significant and often the number of storage positions is a limitation.

Quick change tool blocks ensure the green light on the machine is on for longer. Dedicated tool blocks with clamping unit sets can be supplied with the machine or easily retrofitted onto existing machines. Increased number of tool positions with double tool holders allow the block to be used for both internal and external operations reducing the need for stoppages.
Coromant Capto versus shank tools
Ease of use for the operator – changing large tools on VTLs with big heavy shank tools is more demanding than horizontal lathes and also setting the offset position takes longer time – 15mins on average reduced to 1 min.

Coolant pipe setting is eliminated – when operators are setting the coolant pipe direction it normally takes 2 to 3 attempts to get it right. Poor chip control often then knocks the pipe and so setting is quite a regular occurrence – red light on!

Quicker production start up – using pre-setting outside the machine eliminates “measuring cuts” and operator errors which is a high risk when using shank tools.

The best analogy is the pit stop in motor racing. Calculated through the year if quick change was used the extra machining time is significant not to mention the higher cutting data from increased stability.
Tools optimized for VTLs

**CoroTurn HP**
Combining high pressure, optimized cutting tools and quick change will increase the speed of payback of investment significantly due to:

- Fixed nozzle position – no need for operator setting
- Chip control – reducing machine stoppages
- Increase cutting speed – higher productivity

**Offset sleeve**
The offset sleeve is designed for boring bar applications. It allows boring bars to reach into smaller diameters than the RAM can access.
Offset reduction adaptor
By using an offset reduction adaptor, access to a larger cutting unit program with the same RAM clearance is possible.

CoroTurn SL70 – Serration Lock modular system
Developed for large diameter component features requiring profiling and grooving. The coupling is oval providing extreme rigidity combined with excellent accessibility. Clearance is applied to the blades for axial as well as internal machining so each blade can be used in any configuration. With a range of blades and adaptors this modular system removes the need for special or modified tools. Needless to say HP is standard.
Example – Coromant Capto automatic tool change (ATC)
Component – gas turbine rotor
Material – steel
20 tools – 16 turning, 2 drill, 2 boring
Time reduced for set up from 200 mins to 20 mins
with pre-measuring off line
The ATC ensured unmanned tool change increasing
the machine utilization and overall production time.
(Pallet also reduced component change time significantly)

Example – Coromant Capto manual Quick Change
Component – aero engine casing
Material – titanium
14 turning tools
Time reduced for set up from 220 mins to 25 mins with
pre-measuring off line
Coromant Capto interface combined with CoroTurn HP cutting units and a 70 bar
coolant pump ensured simple and accurate coolant delivery reducing the actual
machining time by 30%

How much can you save?
Visit www.payback-calculator.com and click on productivity calculators today.