

CHANGING CONTAINERS

How Often to Change?

Containers are usually changed at least twice each year. Constant use causes the mid-section to expand, or 'belly'. The container then must be returned to the supplier to be re-machined and relined. However if, for example, the extruder is using both 8" and 10" containers on the same press, he may be changing containers twice a week or even more often.

If the extruder is running his press around the clock, seven days per week, the cost of the necessary downtime then becomes significant.

How Long to Change?

Ask five extruders "How long does it take to change a container?", and you will likely get five different answers, ranging from "Three hours" to "Half a day".

Why does one extruder change containers twice as quickly as another? The answer is that the length of time planned for this operation was likely set years ago and no determined attempt has ever been made to reduce this controllable and costly downtime. The usual reason given is "That's how long it always takes."

The Real Cost of Changing Containers

If the plant is operating 7/24, first calculate the total overhead per hour, both fixed and variable, allocated to the press. This cost continues whether the press is running or not. Add to this the profit per hour that would have been generated if the press was running. This then is the real cost per hour of the press downtime while the container is being changed.

The Solution

First, record the exact time taken for each container change, while making a conscious effort to reduce it. Record the reason why any change has taken longer than the previous best time.

If a container oven is used to bring the new container up to 800°F (430°C) before it is dropped into the press, three men working closely together can safely change a container and restart the press in about ten minutes! This is not simply a goal or a theory. This is how it can be done. This is how it is being done.

The Procedure

The main pumps must be left running to move the ram and container housing during the procedure. In those jurisdictions where guarding prevents access to the press when the pumps are on, the time required to complete the changeover will, of course be extended.

The proper placement of the new container and stem in relation to the press is critical to ensure a safe, rapid changeover, as is the provision of proper fixtures, work tools and lifting slings.

In addition to the crane used to lift the container, since this procedure requires that the stem is changed during the time taken to move the container to its heating station, and to bring the replacement container back to the press, a second smaller auxiliary crane is needed to lift and replace the stem.

The container oven or heating station must be located on the line of centre of gravity of the container. The replacement stem must be located on the line of the stem's centre of gravity.

Both cranes must be aligned before the start of the changeover, and positioned so that the only movement is up and down, and cross-bay. No movement along the bay should be necessary.

The following are also required:

- Heating station for the end of the stem
- Container machined to accept 'wedge' quick release lifting attachment
- Quick release latch for the container
- Quick release connections to the container heating and cooling systems
- Quick removal capability of all thermocouples
- Retaining bolts and threads on stem to be clean and lubricated
- Provision must be made for rigid connection between main ram and container
- All necessary fixtures, lifting slings, work tools, pneumatic wrenches etc. must be conveniently positioned so as to be immediately available for the changeover

Assumptions

To begin, the replacement container is at temperature in the container oven. The replacement stem is in position beside the press.

The main crane is remotely controlled by the press operator, 'Operator # 1'. He removes the tooling in the press, and changes the die holder before aligning the main crane.

'Operator # 2' and 'Operator # 3' operate the auxiliary crane, prepare the container for moving, then work on the stem. Controls to move the main ram and the container are located at the press.

PROCEDURE:

Time (mins & secs)	Operator #1	Operator #2	Operator #3
00:00	take control of the main crane	remove thermocouple(s)	
00:15	unload the die(s)		release container latch
00:30		attach lifting tackle to stem	start to undo stem nuts
00:45			
01:00		assist undoing stem bolts	
01:15	unload the support tooling	auxiliary crane in place	
01:30			stem nuts undone
01:45			assist removing stem
02:00		stem lifted out	install withdrawal devices on main ram
02:15	remove the die holder		
02:30			install withdrawal devices
02:45	crane in position over the container		on container - connect the two!
03:00		raise the replacement stem	container out
03:15	lower main hoist		attach the lifting key
03:30			
03:45	lift the container		
04:00	container raised		
04:15	traversing across bay	lower stem into position	container housing forward
04:30	lower the container		
04:45		align replacement stem	remove withdrawal devices
05:00	container lowered		from main ram
05:15		tighten bolts	
05:30	raise replacement container		
05:45			assist tightening bolts on stem
06:00			
06:15		finish tightening bolts	
06:30	lower replacement container		
06:45		waiting for container	
07:00	container in place on keyways		
07:15		remove lifting key	
07:30			main ram forward
07:45	container latched		
08:00	thermocouples in		
08:15	container closed		
08:30	billet loader up		check alignment with loader
08:45	main ram forward		
09:00			
09:15			
09:30	billet loader in		
09:45	main ram forward		
10:00	extrusion starts		

