

PRODUCTION METHODS – DRILLING AND BLASTING

For nearly 70 years the mining method for winning rock salt at Winsford was through the use of drilling and blasting techniques with the aid of machinery. Although technology in the 1930s wasn't as sophisticated as it is today, the fundamental technique didn't vary, although over the years bespoke machinery was developed for Winsford.

The production sequence was essentially a five-stage process - undercutting, drilling, blasting, loading out and scaling.

To see Drilling and Blasting in operation please refer back to the home page of the website and select 'video clips'.

Undercutting.

Before undercutting began, the surveyors would mark out the face with spray paint, to ensure that operations were carried out at the correct mining horizon. This was done at the start of each morning as there could be up to seven faces to be worked on.

The undercutter was then brought in. This looked and cut like a giant chainsaw, but used tungsten cutting picks instead of blades. Its purpose was to create a 4.6m deep slot for blast relief and, throughout the majority of the Mine workings; this 'stepped' effect can be seen.

Drilling.

Once the floor had been undercut, a drill was used to create a 'drag cut' pattern of holes in the face. This means that the first half of the face was drilled horizontally and the latter holes angled towards the floor. The 'drag' was created by the final holes almost meeting with the undercut floor, which would drag the salt out when the shot was fired.

Although many different types of drills were used over the years at Winsford, the last drill was a computer controlled hydraulic drilling jumbo, powered by electricity but driven using a diesel engine.

The jumbo had two drilling arms that measured the size of the face from the surveyor's centre line and then transferred this information to the on-board computer, which stored the drill patterns. The drilling arms began to operate independently and would drill approximately 70 holes. The rig had an air flushing facility to enable the salt cuttings to be removed from the drilled holes in preparation for charging with explosives.

Blasting.

Using a platform, the shotfirers charged the holes with explosives and electronic detonators then initiated the blast. The bottom row of holes would be the first part of the sequence to be detonated; this was to ensure there was sufficient clearance at the face for the remaining rock to fall as a pile, and not to project outward of the tunnel.

A typical blast would yield 1,250 tonnes of salt. It was customary for blasting to take place at the end of the shift around 3pm, following which it was the duty of the shotfirers to check that the surrounding area was safe and stable for loading out to take place.

Loading out.

Once the area had been cleared by the shotfirers it was safe to enter and remove the rock salt for processing. This was carried out by varying sizes of wheeled loading shovel machines, which loaded from the front using large buckets. Today, Winsford has the largest wheeled loading shovel in any underground mine in the United Kingdom – the Komatsu WA800 which has the capacity to carry 18 tonnes of rock salt in its bucket. *(Continued on next page...)*

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Loading out (Continued).

Up until 1978 the wheeled loading shovel machines loaded the broken rock salt into Foden dump trucks, which hauled it to the crushing plant. From 1978 this was superseded by the feeder-breaker system, which enabled the rock salt to be put directly onto conveyor belts that led to the plant. This significantly reduced diesel fumes within the Mine and speeded up the production process.

Scaling.

Scaling of the blasted areas was required to remove any loose rock and to make the area safe. In the earlier days teams of hand scalers standing on a platform carried out this process. Later, the introduction of mechanical scalers quickened the process up and created a safer roof, as the picks on the rotating barrel scraped the whole roof and not just the loose rock. As mentioned earlier, scaling does not need to be followed by roof bolting at Winsford because of the competent beam of salt left in the Mine roof.

The crushing and screening process has not changed over the years. Please refer to the end of the next section, 'Production – Machine Mining' to complete the production cycle.