

Davy Roll (now Union Electric)

Structural Engineer: CCL
Engineering

Equipment: Churchill roll grinder



Challenge

Part of Union Electric Steel, Davy Roll is a major European supplier of cast rolls to the global metalworking industry with a capacity in excess of 20,000 tonnes per annum. The company approached Farrat with the objective of moving a Churchill roll grinder from Midland Roll in Crewe to Davy Roll in Gateshead. The engineer, who had already designed several foundations for the client contacted us with a view to designing a bespoke isolation system.

Roll grinders present a unique set of challenges as they are not only high precision machines but they are also large volume pieces of equipment with a single unit often measuring up to 10 metres in length and up to 400 tonnes. The machines are long and thin and they have a fixed headstock but the tailstock location will vary depending on the length of roll.

There are two key aspects to the unit: a roll bed to carry component and a wheel head bed on which the grinding head traverses along the roll. The machines are generally installed in areas where there is significant risk of shock and vibration but they are simultaneously required to have lengthy periods of uptime. Any disturbances can potentially lead to a reduction in accuracy and so the effective control of shock and vibration is vital.



Farrat provided vital expertise in helping us to get the most out of this high value equipment.

John Caffrey
Facilities Manager, Union Electric

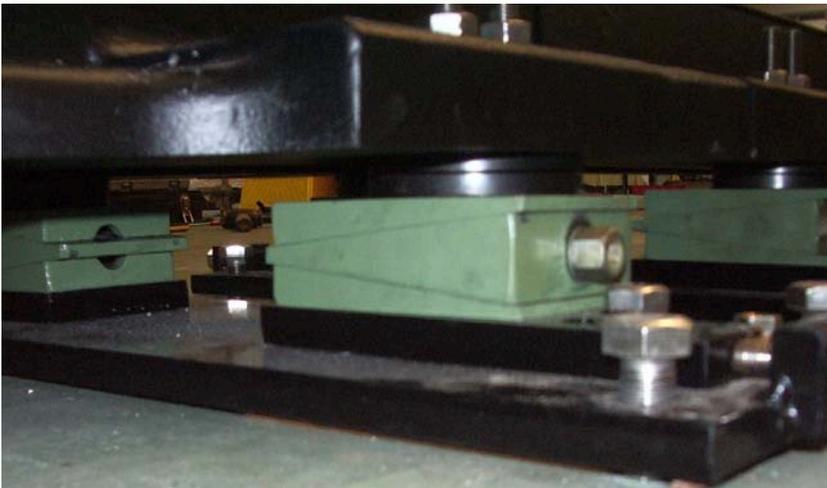
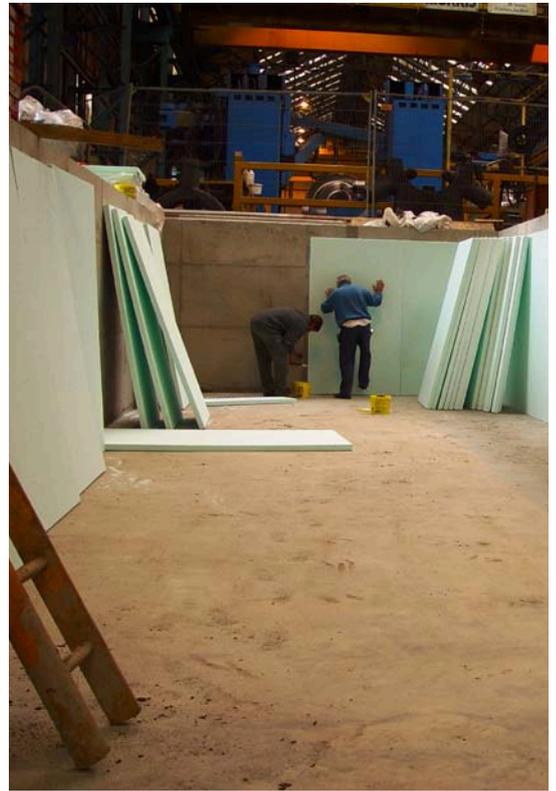


Solution

Farrat proposed an Isomat Foundation system where the isolators could be evenly spaced taking the load pattern of the machine into account under the machine which meant the foundation design could be simplified with a lower stiffness than if it were to be installed on coil springs. The Isomat Isolated Foundation System essentially involves the creation of a reinforced concrete foundation pit which is then fully lined with vibration isolation materials. A reinforcement cage is then placed into the pit and it is filled with concrete to create an isolated inertia block onto which the machine can be placed.

The aim of this solution was to minimise the effects of any changes in load and centre of gravity whilst still providing a very effective vibration isolation system. The Isomat Foundation system also had the benefit that it provided a sealed isolated floor so the void could not get contaminated.

A very stiff machine to foundation connection was critical to the overall operation of the machine and also to obtain the most benefit of mass damping effect of an isolated foundation block. This was demonstrated at a later date as the client was having problems with reverberations in the machine bed caused by a lack of support stiffness from the levelling screw supports. Farrat supplied Wedge Levelling elements as intermediate supports which cured the problem.



Key Facts

-) System dynamic natural frequency 9-10Hz
-) 120 Isomat IM BR 50-50 Isolators

