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LINEAR CHAIN DRIVE MEETS TIGHT DESIGN CRITERIA

Space constraint was the main factor that governed the choice of drive system for an automated sliding door mechanism installed at the restored East Lancashire Railway Castlecroft Goods Warehouse; in which the new Bury Transport Museum is located. However, not only did the chosen system need to be extremely compact, but also sufficiently robust to drive a door weight of 2000 kg for a distance of four metres. Two space-saving but powerful products manufactured by Framo Morat were recommended as a combined solution by sole UK distributor, R. A. Rodriguez.

The Castlecroft Goods Warehouse dates from 1848. It was built by the original East Lancashire Railway to handle locally based freight traffic being transported around the growing railway network and remained in railway use for more than one hundred years.

Although it subsequently became the Bury Transport Museum, the deteriorating condition of the roof led to its closure seven years ago. In 2008 however, a grant funding of over £3m allowed the Grade II listed warehouse to be restored to its former glory.



This building is unusual as it has 12 large sliding doors, three in each of the four walls. All of the doors were required by English Heritage to be restored to open and function as they would have done in 1848. However it was agreed that the sliding door that secures the main visitor entrance could benefit from modern drive technology. The problem of minimal space still presented a problem to the design team, as there was a gap of approximately 90mm between two adjacent door tracks, in which to mount the door drive.

The Framo Morat linear drive system that R. A. Rodriguez proposed comprises a slip-on Compacta rotary actuator that drives a LinearChain whose specially designed chain links allows it to push as well as pull heavy loads. The links have a special profile with interlocking fingers at one end enabling the chain roll or fold-up in one direction only.

When unfolded, the fingers latch together to form a rigid thrust device. The close tolerance manufacture of the links and other components means that both push and pull linear motion with low backlash and high repeatability is achieved. A key feature of the LinearChain for the museum application is that the chain folds up into a magazine to occupy minimum space, approximately one metre, in relation to the stroke of four metres.

The LinearChain drive system comprises a special housing with internal chain guides, sprocket drive wheel and a keywayed drive shaft. It is connected to the Compacta geared brake motor which contains integral limit switches; a handcrank has been supplied in case of power failure. As its name implies, Compacta provides a neat drive solution. By comparison with conventional geared motors it is substantially smaller and lighter but provides the same output torque and speed.

The Framo Motor LinearChain drive system proved to be the ideal solution. The chain magazine and motor chain drive have been installed inconspicuously to the right of the main entrance, sandwiched between the framework for the heavy wooden outer door and the adjacent glass-panelled inner door. There is less than 50mm separation between the two.

The system actuates the outer wooden door at a speed of 100mm/sec; (approximately 40 seconds to open or close). It is an easy means of providing added security without the need to move the very heavy inner glass screen door which incorporates a glass wicket door and forms the normal visitor entrance.

- ENDS -

R. A. Rodriguez has over 40 years experience in the supply of precision components to manufacturing industry in the UK, Ireland and Scandinavia. This ISO 9001:2000 company acts as factory representative for a number of the world's leading component designers and manufacturers. Its product programme falls into five divisions – bearings, linear motion, aerospace, conveyor equipment, gears and associated products. R. A. Rodriguez bearing products include the world-renowned Kaydon Reali-Slim® and Ultra-Slim® designs. In the linear motion field, R. A. Rodriguez supplies a range of solutions from components and sub-assemblies through to complete turnkey systems.

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