Project Profile

April 2005

Case 17400

Jacking Systems

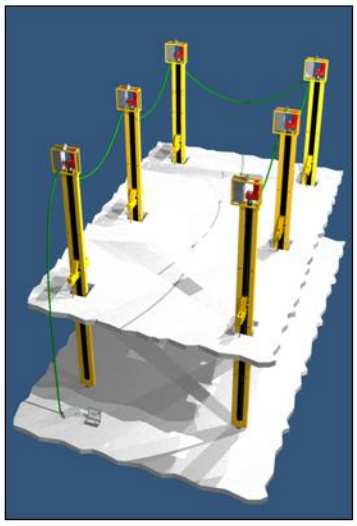
Synchronised Floor Jacking System

Berill Control Systems have been providing the precise motor control expertise required in an innovative means of constructing multi-floor buildings.

Up to 60 motorised jacks are synchronised to lift pre-cast slabs of concrete floor up to 5m at a time. Once the slab has been secured, the jacks can then lift themselves up to that floor where the next level can be poured and lifted.

Each of the motorised jacks has its own motor and controller, which are all networked with a PLC. A laptop computer communicates with the system and provides the user interface.

The PLC constantly monitors the performance and position of each jack and will immediately stop the operation should a fault occur or the position or load of a jack exceeds a set tolerance.



A section of a floor showing 6 jacks

Through the SCADA system running on the laptop, the operator is able to start and stop the jacks, monitor progress and alarms, manually control an individual jack, and view data about the performance of each jack such as loads and positions.

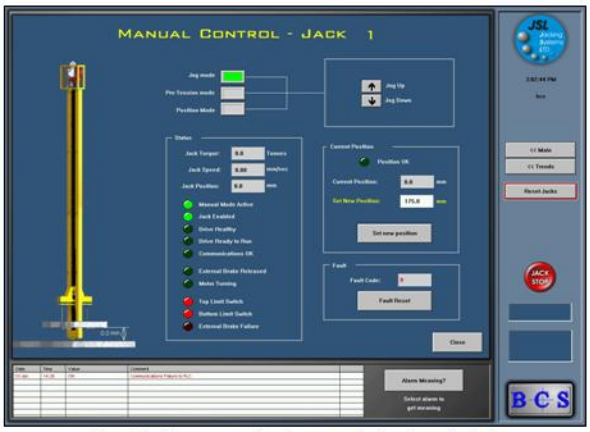
BCS designed a logical, easy to use interface, which is operated in a step-by-step fashion to ensure all the required actions are carried out, from configuring and datuming the jacks, through to performing the actual lift.

The system will automatically pre-tension each jack to hold a certain load prior to each lift. This ensures that the load of the floor is evenly distributed over all jacks.

Another feature allows the system to tilt a slab to a specified angle and this has been used to lift car park ramps into position.

Technical Information

- A Siemens S7 PLC controls the Jacking System, which can comprise of to 60 jacks.
- Each jack has it's own 1.1kW SEW brake motor, encoder and MoviDrive controller
- An Interbus network links all jacks with the PLC.
- The Interbus network is configured so that upon initialisation, network IDs are automatically assigned to each jack according to their order on the network, allowing for quick and easy site setup.
- The user interface running on the laptop was developed using WonderWare.



User interface screen allowing manual operation of a jack

A system containing 36 synchronised jacks, ready to lift the first floor into position