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| **Topic** | Safer maintenance and housekeeping |
| **Entry number (MPA Ref)** | 202457 |
| **Title of Entry** | Eliminating Live Working during mould changes on automated wet-cast line CMS1 |
| **Name of Company** | Brett Group |
| **Location** | Brett Landscaping Pocklington |
| **Video X (if yes, please include URL for video)** | 2 on request |
| **Other resource X (if yes, please include description)** | 7 images, 2 word docs |
| **Fatal Theme (tick boxes that are applicable) 1 X 2 [ ]  3 [ ]  4** **[ ]  5 [ ]  6** **[ ]**  |
| **BACKGROUND** |
| Pocklington CMS1 produces wet-cast concrete slabs on a fully automated manufacturing line of 10 chambers, each containing 600 mould carriers. Products are cast into plastic moulds within the metal carriers, which transports the filled moulds through the production line into curing and then turned out for packaging by robots. The moulds require periodic removal for cleaning or replacement, with 1 chamber replaced every 2 weeks. Historically, this was undertaken with part of the enclosure fencing removed to access the production line. The task required.* An experienced operator manually controlling the line to bring 3 carriers forward when directed and then hold in a static position.
* A Person in Charge (PIC) at fence line, in line of sight of operator, confirming all personnel clear of line, who directed the operator.
* At least 1 other who removes the 3 moulds and replaces before retreating clear of the manufacturing line.

Once all personnel confirmed clear, the PIC would signal for a further 3 carriers to be advanced, repeated 200 times, over an 8-hour period to change a single chamber.This process relied on the concentration of the whole team to prevent Contact with Moving Machinery (Fatal 6) and was controlled under a Live Working Permit - RA/SSOW Z4-23 Cleaning Contaminated Moulds issue 2 covering this task. To reduce the risk of concentration errors, the SSOW required dedicated breaks every 90 mins. Following a serious incident at a site when a clam shell door, that could be operated manually despite the rest of the press being isolated, closed onto the fingers of an operative resulting in a RIDDOR Specified Injury, a business wide review of all live working activities was undertaken. The live working replacement of moulds on the CMS1 line was identified as an activity that could be eliminated.  |
| **MANAGEMENT OF PROCESS** |
| The site team firstly considered whether this task could be undertaken using the access via an existing key-exchange interlocked gate. The gate location was not in the best position to safely access the line to change the moulds and required a 30 second walk to a panel located on the other side of the control room to reset the safety system and return. As this was undertaken 200 times per chamber via several stairways, the site management team did not consider this to be a practical solution.The activity was discussed during the site’s SHE committee and it was agreed to investigate whether a Light Curtain could be added inside the current enclosure fence line. This would automatically stop the production line and hold it until reset using the Safety Programmable Logic Controller (PLC) to disconnect power to the line when the light curtain was broken.The new light curtain was installed by SMART CI Group, together with a lockable hinged gate to allow access to the production line, and then integrated into the Safety PLC. The total cost for the new equipment was £6.2k.The mould change process was re-assessed and new RA/SSOW Z4-23 Issue 4 was developed and trained out. As part of the safe design, an emergency stop button is located on the outside of the gate and the light curtain reset is located c 2m away from the gate so it cannot be operated from inside light curtain area. The new light curtain has eliminated live working though the activity is still controlled under permit to work. It no longer relies on the coordination with the operator controlling the line manually and the PIC, as the line stops whenever the light curtain is broken. The key for the lockable gates is controlled and secured by the senior team during production. To further prevent personnel entering the working area during mould change, a pedestrian gate was adapted and can be chained into position. The process for changing moulds can now be undertaken by one person, though it is generally undertaken by 2 people. The modifications reflect the MPA H&S value of high-quality implementation having involved the site team to develop the solution. |
| **BENEFITS** |
| The installation of the light curtain which disconnects power to the production line when broken, has eliminated all live working to change the moulds on CMS1 production line. As a result, the process is no longer reliant on the concentration, effective communication, and safe behaviours of all the personnel involved to prevent contact with moving machinery. This activity is undertaken every 2 weeks or 25pa , taking c8 hours, thus c200 hours of live working activity has been eliminated.Previously the task required the coordination of 3 personnel working under a live working permit. With the light curtain in place, the task can be undertaken by a single operative, though a standard permit to work is issued whenever the lockable access gate is opened to ensure team leaders are still supervising the activity.  |
| **INNOVATION** |
| Light curtains within the Safety PLC systems are frequently used on manufacturing lines where interaction of either personnel, vehicles or equipment of the line is required. The CMS1 wet-cast manufacturing line was installed c 20 years ago but did not have a method for changing moulds on the line without using the manual override controls to index the line. The removal of the enclosure fencing created a live working situation and increased risks of contact with moving machinery. The site team took their knowledge of light curtains’ ability to bring the line to a safe state for interaction and applied it to the process of changing the moulds within the carriers without live working. |
| **DEVELOPMENT & TRANSFERABILITY** |
| Dependant on manufacturing line and Safety PLC system set-up, similar installations of light curtains can be used for eliminating live interaction with highly automated manufacturing lines, within MPA’s precast and bagging operations.The site team are also investigating whether they can upgrade from a lockable gate in the enclosure fencing to a key exchange interlocked gate that only activates the light curtain whenever opened. Currently the light curtain must remain powered even when the gate is locked into position. |
| **NB if document has embedded images try and include these****If other documents provided say additional information available.** |