Unilever - filling

To Replace or To Refurbish?

Unilever, Port Sunlight, UK was faced with a familiar production issue whereby under performing, obsolete equipment presented a risk to continuity of supply. The question was to replace the filler with a brand new one or to refurbish the existing line and remove problematic areas. Unilever investigated by calling in Farasons (the original machine builder) and their technology provider Capley Marker Systems.

Unilever manufactures many home hygiene products, the Hyper Chlorite Bleach production line was showing signs of low performance using Unilever's standard metrics of OEE (Overall Equipment Efficiency) and additionally by monitoring the number of shifts required to hold schedule adherence. Complete replacement would be capital intensive and it was known that the performance of the bottle filling was limited by particular issues rather than overall wear and deterioration.

In discussion with the machine builder Farasons it was agreed that new technology intelligent load cells and a new automation controller would bring the machine back into efficient production. Particular productivity problems were associated with all three attributes of OEE. These were performance, as the bottle handling and filling was slow, availability, as the weighing and control system was unreliable and parts were hard to obtain, and quality as the bottles had to be overfilled by weight to be sure that commercial requirements were satisfied.

At the centre of the solution was the use of 40 new HBM intelligent load cells and their integration to a new Siemens S7 logic controller. The logic controller being physically mounted on the machine carousel to simplify load cell connection, external connections being made through a slip ring assembly. HBM intelligent load cells are used for bottle filling valve control, bottle presence detection (through TARE) and leak detection (by measuring rate of weight change whilst filling).

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The load cells are connected by multi-drop RS485 to the S7 communications port. All values are available in engineering units directly from the intelligent load cells. Additionally, the load cells communicate by digital IO to the controller for valve control for filling. Filling is done in two stages, course and fine, to ensure accurate filling by weight.

The carousel mounted PLC communicates externally through a slip ring assembly that carries RS485 to a calibration and programming port and also Profibus to a Siemens touch screen HMI for machine operation. Power to the controller is 24 VDC is also fed via the slip rings.

To facilitate the ease of mechanical upgrade it was possible to fit new intelligent load cells in the space of the

HBM Intelligent Load cells on generic filling machine (not Unilever)

old sensors on the machine as they had a similar physical size and mounting.

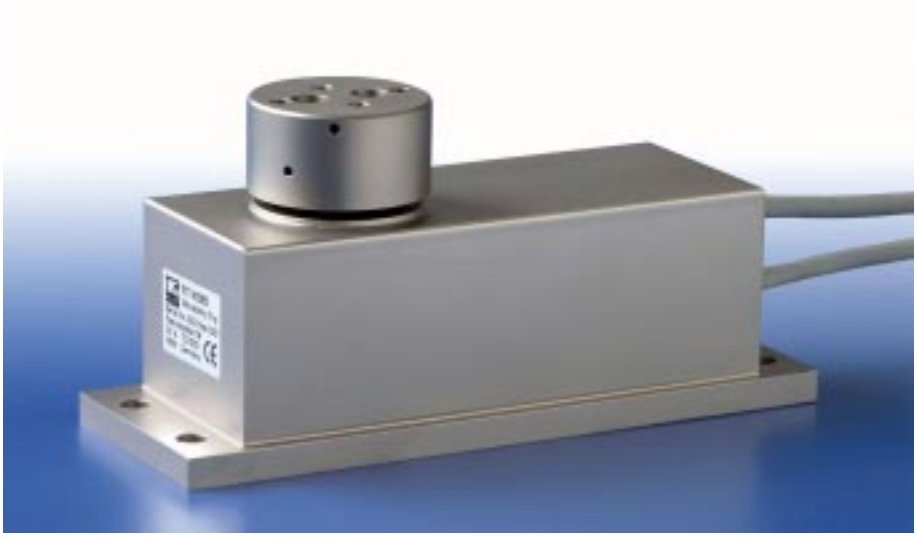
Capley Marker discussed the functional design requirements with Unilever personnel and developed a solution which proved to be a vast improvement on the previous system via OEE monitoring.

Thanks to continuous OEE monitoring by Unilever, rebuilt filling machine's performance can be accurately compared. Filler speed is up by 30%, weighing accuracy is vastly improved and "giveaway" is "negligible." There is less spillage by overfilling and less maintenance. The machine runs 24 hours and either 4 or 5 days a week depending upon schedule, there is therefore spare capacity to respond to market demand changes. Unilever utilises SQC and production improvements were instantly confirmed. The site was thus measurably more efficient and in step with group KPI's.

The critical bottle filling refurbishment was part of a comprehensive upgrade of other machine in the bottling line and as such was part of a larger time-critical plan.

During the project all work had to be done on-time as bleach manufacture at Port Sunlight is central to Unilever's bleach capacity. Capley Marker with Farasons and good working relationships with Unilever's engineers brought the project in on time and on budget - thereby avoiding any possible delivery issues with Unilever's many retailers.

Mark Stuffin, Unilever Engineer said on behalf of the project team, "the refurbishment has proved to be very effective and it was the right decision, being far more cost effective to wholesale machine replacement". The automation, control and sensor know-how exhibited by Capley Marker systems was central to this comprehensive machine re-build and should ensure another 20 years of service.



HBM Intelligent Load cell

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