

Four years ago, when EN206-1 (the Euro standard for concrete) and BS8500 (the supplementary British standard) were looming, Hymix took note of their customers' concerns and tasked their design department to find a solution. The result was a patent application and the establishment of the Mix Master concept.

Unlike the outgoing BS5328 standard, the new standards were to become legislative, encompassing the constituents, specification, production and, crucially, the delivery of fresh concrete. Understanding the nature of how concrete is delivered to the job site and the variety of events that can occur between the batching plant and the point of use, Hymix set about finding solutions to manage, or at least record, these events.

Simultaneously, other legislative changes were on the horizon. These included the draft CEN on transit mixer safety and the introduction of rear-facing cameras to assist in the safe reversing of the trucks. The draft CEN imposed new restrictions on the control systems for mixers, including the requirement that there be a clear visual indication of the control status and, common to most equipment, the requirement that the control in the cab and the rear control station be mutually exclusive. These changes were reinforced by a number of serious accidents in the industry that caught the attention of operators across the country.

It is important to understand the crucial role performed by the mixer and its driver. Unlike a tipper, the transit mixer can change the product, affecting the final delivered quality, and the driver has a clear responsibility for this process.

Those directly involved in the



In The Mix

A new concept for delivering quality-assured ready-mixed concrete from Hymix

production and delivery of wet concrete will recognize that not all trucks are the same, some are classed as mixers, whereas others perform as agitators. The agitator is best suited where the complete mix design can be met at the plant in a pan mixer or other batch-mix process. A mixer, however, is designed and built to produce a homogenous mix within minutes of loading the individual constituents into the

drum itself. Not only does this deliver real benefits in dry-batch production, but should any alteration to the mix be necessary on site, such as admixture addition, then a mixer will help to ensure that the mix is complete, consistent and performed quickly, a distinct advantage in any application demanding uniform quality.

The time-honoured method of ensuring quality was to leave it ►

Inside Hymix's factory



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Mixers are designed and built to produce a mix that is complete and consistent

to the skill and commitment of the driver, with any additives recorded manually on the delivery ticket, but this is set to change. The Working Time Directive, driver hours legislation and socio-economic change have combined to introduce a range of different driver solutions to the industry, each of which requires a different management approach. Hymix say that their solution provides answers to all these challenges and delivers a new level of information for stakeholders previously once removed from the process.

Central to the process is the question of delivering quality with traceability to the customer and end user. Just as it is change that has produced the justification for the Mix Master system, so it is technological change that has made it happen. The advent of CANbus technology, the reduced cost of and improved reliability of electronic components, together with the increased access to communication and satellite data, have all combined to lower the cost and broaden the acceptability of this methodology.

The Hymix system uses a number of sensors fitted to the mixer, which provide inputs to a central processor specifically developed for mobile applications. Other inputs are taken from the control panels in the cab, at the rear of the mixer and, optionally, a

hand-held or plant-based control unit.

The processor assimilates the data received and then outputs data to provide actuating signals to control the mixer, display information on the control panels, and quality delivery and accounts data to the plant. The cost of the system depends on the number of sensors, controllers and the data collection and processing demanded. The programming of the processor will be tailored to each operating company, but once established can be installed on any future vehicles.

In terms of EN206-1, the benefits are derived in the quality of data specific to each load and the traceability right to the point of discharge. Sensors will record the time the mix has been 'live' in the drum, the number of revolutions the drum has completed since the components of the mix were added, and the time, ambient temperature and humidity. This information is all helpful, but Mix Master can provide more detailed data.

Data is processed about the load in the drum itself. Weight, hydraulic pressure and drum speed can be measured and utilized to calculate the workability class. This is augmented by sensors that measure any water or admixture addition, validated by change in the weight of the load and any

corresponding change in workability. This will certainly help with validating the conformity.

Taking the mix design from the computer at the plant, Hymix are developing software that will record any changes that may affect the predicted final strength of the load. All this data can be printed on to the final delivery ticket and, on returning to the plant, the truck can form part of a wireless network and upload all the data about the load to the company's IT system. In addition, the system will not only warn of calibration dates, but will also take the operator through the calibration routines and recording when they have been completed.

All of this will help the quality control team, while also benefiting those in production and, less obviously, those in the tendering process to demonstrate the traceability expected of a modern professional supplier.

To the mixer driver the Mix Master system represents a user-friendly control system. It provides a simple means of controlling the machine and takes care of many of the tasks that, historically, demanded physical effort. They will complete their day less fatigued and cleaner than using conventional methods. From a safety perspective, the operator is allowed to remain clear of the danger zone in and around the chutes at the rear of the truck. The mixer will always start in a 'safe mode' and proactive intervention from sensors on the mixer can help ensure that the mixer is recovered from a state in which it may topple. A driver PIN number system will limit operation to authorized persons only, and the ability to see immediately the direction and speed of the drum rotation and to isolate the controls from each other means the system complies with the draft CEN on transit mixer safety.

The fleet management department will be helped by the on-board diagnostics, satellite navigation and tracking options, together with the service interval warnings that are computed to reflect the way the mixer has been worked. All functions are configured to help avoid damage through lack of care or abuse. The drum control is ramped to ➤

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The Mix Master system's processor assimilates data to control the mix

suit the operation and the water pump will switch off automatically when the water tank is empty.

For accounting purposes, there is the possibility of collecting signatures on site at the point of delivery, and the data transfer between truck and plant can integrate with the accounts system and to allow accurate

automatic billing. A further enhancement comes through the optional radio remote controller that can collect the electronic signature for the delivery on site with the possibility of taking credit or purchase card details and processing payment at the point of delivery.

The benefits are clear in terms

of information gathering and processing, but the opportunity exists to save costs too. For some, EN206 has meant a more generous quantity of cement is batched into each load with consequences for cost base and environmental impact. Others have used more technical resources, increasing technicians on site and in test procedures; many companies use a combination of both. Closer monitoring of the mix and what happens during delivery should provide the confidence to use technicians less and optimize the cement in each delivery. Bespoke programming will allow for customization, company branding and integration with existing in-house quality, production and accounts systems.

Hymix have spent a number of years developing the Mix Master system, which embodies improvements that should combine to make it reliable. This is reflected in the IP69k rating achieved for the rear panel. Initial installation testing and validation is being completed on Hymix units, but the company believe the product will eventually be available for fitment to other makes of units. ■