

Of packaging lines and racing cars

Packaging Digest Staff -- Packaging Digest, 11/1/2003

Benchmarking with other highly competitive industries is essential for leading companies in the packaging market. History shows numerous successful applications of innovations applied to different markets, for example, Ford assembly lines and Wal-Mart distribution innovations. The same concept of benchmarking applies to packaging lines and racing cars. Saving a fraction of a second on a filling cycle at a consumer company may save \$1 million per year, and it can also make the difference between winning or losing an auto race. This is a lesson Hendrick Motorsports' (HMS) teams know well. HMS utilizes a wide array of technology to succeed, and this technical edge has helped support four Winston Cup championships. From engine performance to suspension to pit-stop effectiveness, all aspects are optimized in order to attain victory.

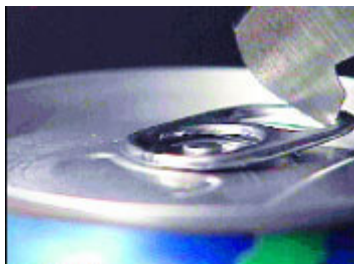
Packaging line changeovers draw sharp parallels to pit-stop optimization. In fact, world-class packaging companies have trained packaging teams using pit-stop techniques as a model.

To support its pit-stop efforts, HMS uses the 20/20 Hindsight high-speed digital video system from Monitoring Technology Corp. Solving production and quality issues requires the ability to actually see the problem occur. With today's high-speed equipment, staring at a suspected problem area waiting for a failure and then guessing at corrective action is both inefficient and time-consuming. 20/20 Hindsight eliminates wasted time and money by utilizing a patented technology to record digital video while storing up to 48 continuous hours, even while simultaneously reviewing previously recorded events. Just point the camera at a potential issue and walk away. After the next line jam or product defect, simply scroll back and replay in slow motion.

20/20 Hindsight provides another set of eyes on the manufacturing floor. The system can take pictures at up to 0.00001 of a second shutter speed, constantly record up to 60 picture/sec and hold multiple hours of video in a circular buffer. The system continuously records video and allows users to look back in time to see exactly what caused packaging jams or process upsets. 20/20 Hindsight can also read trigger input from PLCs, video systems and other equipment to create video events and mark to the exact millisecond. The system can even record and display up to four camera views synchronized in time. By seeking the root cause, line personnel can make the proper adjustments and improve efficiency. In addition, users are able to increase the speed of the operation and determine where quality issues are starting. 20/20 Hindsight provides users with a tool to run faster, more efficiently and with less defects. Without 20/20 Hindsight, operators are running blind, without the ability to review what really caused downtime.

Applies to both packaging and pit-stops

Says Matt Clark, pit crew coach, Hendrick Motorsports, "Using the 20/20 Hindsight system, we can capture and analyze a full pit-stop in high-resolution detail, or focus on something as specific as the angle of an air gun removing lugs. With these added capabilities, our teams will reduce errors and continually improve their efficiency?winning the war in the pits, week in and week out." HMS points out four essential aspects that apply to both packaging and pit-stops: time studies to optimize actions, training on each action, measurement of results and post-review of performance.



Time studies: A single camera mounted on a boom over the car monitors each member of the pit crew, as the high-speed video times each action. Complex models are generated to determine how to squeeze 1/4 sec from the stop. Similarly, packaging companies study how each line changeover should be performed. Activities are scheduled to allow for the minimum time required and each team member has a function during the changeover.



Says Bob Trimpe, application engineer for R.A. Jones, "We've had the 20/20 Hindsight system for about eight months and use it both at our own plant and at customers' plants. It holds up to eight hours of data, and we can set it to record data even when we're not there. Then we can go back and look at things



that happened when we were recording, whether it was ten minutes or two hours ago. For example, a cartoner may have trouble opening cartons, but we don't know whether it's a problem with the machine or with faulty cartons. We can go back and look at the operation on the video and pinpoint the cause of the problem immediately without guessing or assuming."

Training: Each action is recorded in high-speed video; so different pit-crew members can see how to perform the actions more quickly. Failures are reviewed to stop reoccurrence, especially during race time. Training multiline teams to accomplish complex changeovers can be difficult. Mistakes can cause massive line downtime and defective output.

High-speed video can be used as a reference. Video can show "perfect" procedure or "perfect" machine operation.

Gary Gresnick, an engineering manager at Procter & Gamble, says that being able to play back failures caused by operator error provided P&G's operators with a better understanding of their role and interactions with the packing line. "Our skilled mechanics and electricians use the camera during shift-change meetings to show the next crew what to watch for and how to fix the problems. The ability to save clips even allows training of operators who have been on vacation for a week and may have missed some key learning sessions. I can envision a time when we will be able to

e-mail clips to other production sites with similar equipment and further enhance learning opportunities."



High-speed video system solves packaging line issues. It eliminates wasted time and money by utilizing a patented technology to record digital video images, while storing up to 48 continuous hours.

The high-speed digital video system captures images of events taking place on packaging lines for later review and analysis. Shown here (left to right), are a piece of metal catching on the pull-tab of a flip-top can, glass bottles shattering in a rotary filler and lids being applied to deodorant containers.

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Measurement of results: Video clearly shows how long each action requires and shows the entire pit-stop time. In an auto race, hundredths of a second are shaved with review of video and training. This saved time often translates into winning or losing. Similarly, hundredths of a second may also determine whether a packaging line wins or loses in the market. Reducing line changeover time or equipment dwell times can easily drive cost out of production and increase line flexibility. Companies look to manufacturing to be a competitive weapon in the market. High-speed video can help uncover these wasted seconds. "20/20 Hindsight provides a powerful tool for our service team," say Russ Coffman, a project engineer at SIG Combibloc. "By using the system, we can optimize our machines and other packaging equipment to help customers increase production."

Review of performance: HMS plots the time of each action and the pit-stop both for practices and for races. Like in packaging, performance after the stop is critical. If a tire is put on quickly but later fails due to a small cut during installation, the team still loses.

As improved performance metrics are utilized in the operation of lines, improved tools will be needed to drive efficiency improvements and eliminate short machine stops. "20/20 Hindsight is easy to use and can look at places/angles that operators cannot," says Gresnick. "It provides continuous monitoring, while operators are free to do other work, and provides the frame-by-frame analysis of each failure that is critical in identifying root causes. After having this camera for more than a year, I can't imagine running a packaging line (efficiently, anyway) without one."

20/20 Hindsight is used by more than 200 customers to play back the cause of line jams, to provide a training platform and to optimize equipment for maximum output. Several of the top equipment manufacturers, such as SIG Doboy, R.A. Jones, Scandia, Arpac, Schneider, Autoprod, Holmatic, Brenton Engineering, use 20/20 Hindsight in their own plants.

More information is available:

[High-speed video system](#): Monitoring Technology Corp., 703/698-5520. Circle No. 210.

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Hendrick Motorsports uses the video system to fine-tune the training of its pit-crew technicians. In the example above, a tech practices removing a lug nut. HMS has learned how to perfect this procedure to shave tenths of a second off of their stops. The tech actually removes the wrench while the nut is still on the lug. With proper technique, momentum will propel the nut off while the wrench is moved to the next nut. Photos © HMS.