➤ Manufacturers are now taking video collaboration outside of the boardroom and onto the plant floor.

Advances in Video Collaboration

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Video conferencing has become a standard form of communication across enterprises. In fact, video conferencing is expected to become a $10.8 billion industry by 2015. The standard form of video collaboration facilitates face-to-face meetings in video conferencing meeting boardrooms. For manufacturers, though, the heart of their business is often the plant floor—where traditional video conferencing doesn't reach.

Secure Mobile Video

With the development of new mobile technologies, the opportunity for video collaboration has expanded. Manufacturers are now taking video collaboration outside of the boardroom and onto the plant floor, to a supplier location, or into the field where the problems are occurring.

These mobile technologies generally include wireless video devices for use on the plant floor and collaboration software for the remote experts' desktops. Plant workers use the mobile device to share video, voice, telestration (i.e., onscreen drawing) and images with the experts who interact live through the collaboration PC software. Remote experts can also share images or pre-recorded videos to play on the touchscreen panel of the device. By sharing this visual content, the experts can provide plant floor personnel or field technicians with visual instructions.

For many manufacturers, their plant floor operation contains competitive and sensitive information; for this reason, cameras are typically not allowed on the plant floor. In many *Fortune* 1000 companies, potentially "rogue" video devices such as smart phones must be checked at security. New video conferencing mobile devices overcome that concern by providing tight security over the wireless communication, media content and device usage. Security, encryption, authentication and even centralized administrator control have become tablestakes for mobile video collaboration products.

Reduced Downtime

For one major consumer packaged goods (CPG) manufacturer, this kind of mobile collaboration has helped in various operational situations, including production line equipment maintenance and repair, supply chain interaction, and OEM vendor communication. Video collaboration was first used on the CPG manufacturer's plant floor to help maintain and repair critical production line equipment. If a machine was down and the right engineer was not available onsite to troubleshoot the problem, downtime rapidly escalated.

By using the mobile video device to show a remote expert the failed equipment, the manufacturer was able to remove costly delays from the repair

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process. Together, the production line engineer and remote specialist can now collaborate to identify immediate corrective action plans.

Production equipment downtime costs can be staggering. With downtime costs averaging from $500 for a stand-alone machine, $1500-8500/hour for a production cell or even as much as $3500/minute for an entire auto factory line, reducing downtime is critically important. Trying to troubleshoot an equipment problem through pictures via e-mail or waiting for an offsite specialist to travel to the problem site adds costly hours that can be easily avoided with mobile collaboration technologies. Much of this delay can be reduced or eliminated by bringing the problem to the expert, as opposed to the other way around.

Plant personnel share video of problematic equipment and discuss solutions with off-site experts.

Improved Supplier Interaction

The CPG manufacturer also uses mobile collaboration to streamline supply chain interaction. Design reviews and first-run production samples are an ongoing part of standard communication with suppliers. Normally, team members would travel to the supplier locations for live interactions, introducing delays into the process.

Instead of travel, the mobile devices are now kept or shipped to major suppliers to perform live visual communication when needed. The camera optics within these mobile devices are so advanced that remote experts can see detailed design aspects where even a fraction of a millimeter matters. In some cases, third-party cameras such as microscopes or borescopes can also be attached to the mobile device to show the remote experts even more detailed visuals. By interacting live with suppliers on the plant floor, this manufacturer has accelerated product delivery, reduced travel costs, and leveraged scarce expert resources in their own company and that of their supply chain partners.

The CPG manufacturer also uses mobile collaboration with its OEM vendors to perform acceptance test processes on new production line equipment. The process was traditionally conducted at the supplier site. Multiple skill sets were required to adequately inspect and test the new production line equipment, which equated to teams of people travelling to the supplier's facility. In many cases, the OEM vendors were not just in the next state, but in another country or continent.

Instead of sending a team of people, this manufacturer now sends one person

The off-site expert views video, photos and drawings to help plant personnel find a solution.

with the mobile collaboration device to stream video and interact with colleagues to perform the acceptance test. Expense savings in this application alone have been as high as €50,000 (approximately $67,500) in just one use.

Remote Process Reviews

For global manufacturers with internal or supplier locations around the world, the importance of visual communication becomes even more important to overcome language and cultural barriers. For one supplier to the automotive, aerospace and medical industry, mobile video collaboration has helped visually connect engineers in technical centers with plants in locations such as Mexico.

In one instance, the manufacturer experienced an abnormally high scrap rate for one of its products. Language barriers and the inability to capture movement made e-mail and phone communication insufficient to resolve the detailed process issues. Instead of sending specialized engineers to Mexico, the manufacturer held a live collaboration session.

The team in Mexico streamed video from the plant floor using the mobile device to show the engineering team the existing production process. By seeing the process live, the specialists identified numerous process errors. They then communicated the problems and corrective action steps during the live collaboration session.

To make sure the feedback was clear, the production team in Mexico then showed the remote engineering team

Screen shot of the video collaboration software.

the revised process. This collaboration took three hours instead of the estimated three or four days that typically resulted from attempts to correct problems over e-mail or travel. As a result, the scrap rate immediately decreased by 25% after the new process was implemented.

Internal Education

With the emerging problem of aging workforces, leveraging scarce expert resources can also be a major concern. For one manufacturer of industrial equipment, this was their top concern.

This manufacturer had more people in their company over the age of 50 than under the age of 30. Within five to 10 years, their top experts would retire, leaving their business without adequately trained resources. Mobile video collaboration provided this organization with a way to leverage its scarce expert pool and effectively mentor staff in the field to develop new experts.

Network Requirements

While many benefits and cost savings opportunities are related to using mobile video collaboration on the plant floor, it is important to consider the infrastructure requirements. The main requirement is that the mobile devices have either an Ethernet or wireless network connection to access the Internet.

Wireless connectivity (i.e., 802.11 b/g) is the most common method used at a manufacturing plant to keep the device mobility level high. While manufacturers have often invested in wireless networks to share equipment sensor data, these networks were not always constructed with video in mind. As a rule of thumb, most manufacturers use video settings for their mobile devices that require approximately 500 kbps of bandwidth at the plant. However, this mobile video collaboration can be successful with less than 500 kbps as well.

In other industries, such as oil and gas or mining operations, it is more common to see bandwidth consumption below 128 kbps due to narrow bandwidth backhaul connections. Even with only 128 kbps, mobile collaboration can include live video, voice, telestration, and image sharing between the field technician and the remote expert. For manufacturing plants, though, the additional bandwidth capacity is typically worth the investment.

Wireless Alternatives

Another alternative to consider is the use of 3G or 4G cellular networks through mobile Wi-Fi hotspot devices such as the MiFi or Cradlepoint. By using a hotspot device, a wireless network can be created for the mobile device anywhere there is adequate cellular coverage. For example, heavy industrial equipment manufacturers use cellular connectivity to perform live collaboration from the field when they need help repairing equipment.

Deferred collaboration is another possible alternative to a live video session. When access to the Internet isn't available or other challenges arise, such as problems in connecting with experts due to time zone differences, the video devices can record to a local SD card. The recording can be uploaded to a shared directory for the remote expert to access later, or the device operator can share the recording in a deferred live collaboration session with a remote expert. While the recording is playing, both parties can still talk, telestrate and share images in a fully interactive deferred session.

Extend Existing Video Infrastructure

For organizations with investments in meeting room video infrastructure such as Cisco TelePresence suites or Tandberg videoconferencing rooms, mobile collaboration solutions become immediate extensions. The mobile devices and collaboration software use the same industry-standard protocols and media Codecs as the room-based video technologies. For manufacturers, that means that these mobile devices can immediately deliver a "live feed" from the plant floor or the field to add value to traditional face-to-face video meetings.

In addition to face-to-face video rooms, mobile collaboration sessions can also be shared with multiple experts on their desktop computers. This "one-to-many" experience can be provided in many ways. One method is to simply call another desktop that has the collaboration software loaded. In this case, the additional experts can interact fully with capabilities like telestration and image sharing. Another way is to launch an online meeting tool such as Cisco WebEx. With this method, colleagues, suppliers or customers can be brought in to a collaboration session for ad-hoc meetings very quickly.

Multiple Benefits

With the advent of mobile technologies, securely extending the power of video collaboration across a manufacturing enterprise is now a reality. Manufacturers have proven that mobile video helps reduce downtime, drive quality improvements, accelerate product delivery, leverage experts and eliminate unnecessary travel.

Video is now an essential component of interaction between manufacturing facilities, suppliers, customers and OEM vendors. For many manufacturers, engaging in a video collaboration session has become as simple as making a phone call.

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