PlantTalk®:MES

Manufacturing Execution System

Powered by Datanational Corporation
www.PlantTalkMES.com

Your shop floor is the heart of your operation. It is where parts are made, processes performed, orders assembled, shipments packaged and shipped, and revenue generated. With this understanding, Datanational designed and developed **PlantTalk:MES, a fully integrated Manufacturing Execution System.**

PlantTalk:MES is designed to control and direct the operations at the shop floor level, assisting the shop personnel in getting their jobs done accurately and efficiently. This can be achieved by focusing on a very specific area of your operation, or can be implemented across your entire plant floor or extended enterprise.

Solutions of this type typically require the skills to integrate the machines, tools, as well as production reporting and alert systems with communications equipment and ERP systems to inform and guide your employees. Datanational possesses the required knowledge and expertise to enhance your existing systems or implement new systems to your specific project requirements.

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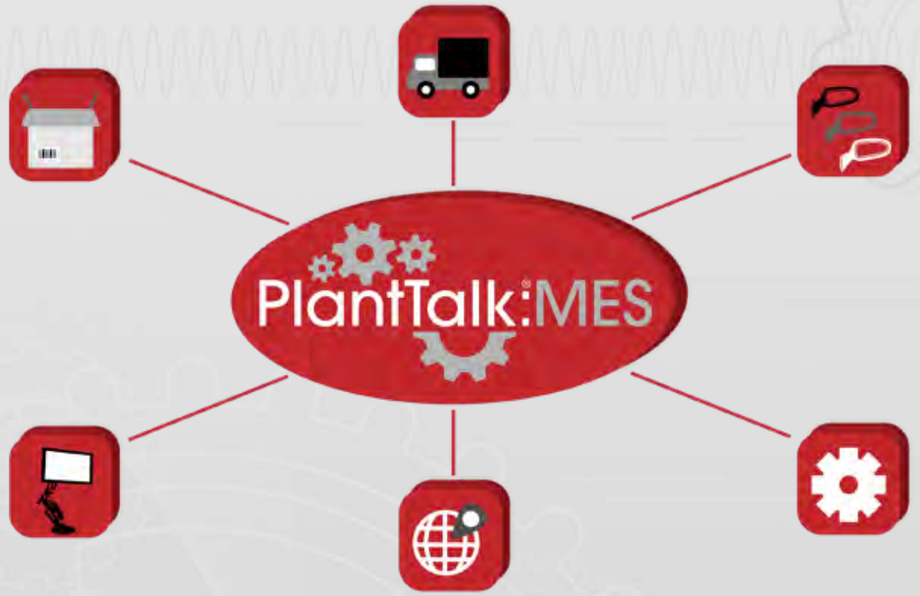
PlantTalk:MES Solution Portfolio

The system is comprised of several solution modules that can be integrated as a whole, or implemented independently, as your project requirements dictate.

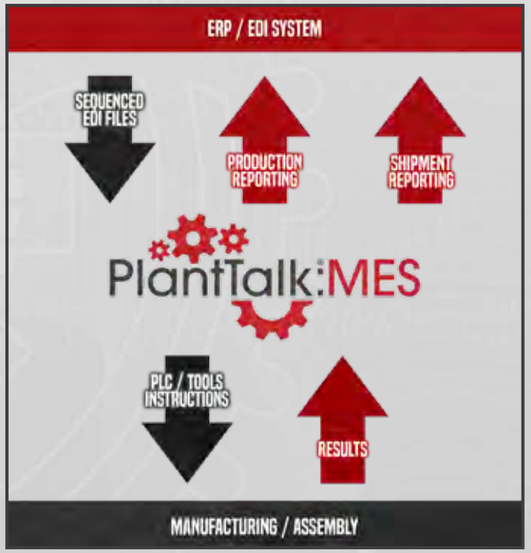


The system has predefined entry and exit points for integration with other systems, such as:

- Business Systems
- (ERP, MRP, Accounting)
- EDI Software
- PLC/Machine Level Systems
- Plant Maintenance Systems

These interfaces include functionality for:

- Production and Scrap Reporting
- Shipment Status Reporting
- Machine Efficiencies and OEE data
- Receipt of Sequenced Data
- OEM Payment Reconciliation



PlantTalk:Build

The PlantTalk:Build module has been designed to assist the line operators with a single piece flow of commodities. This includes providing step-by-step work instructions at each applicable station, scanning and machine interfaces for part and component validation, work-in-process and finished good part labeling, as well as rack completion and shipment verification. This process allows for full lot traceability of all applicable parts and components to the finished good part.

The end-user hardware that is typically used is a combination of compact-frame PCs or thin clients with flat panel monitors (optional touch screens), attached scanners at applicable stations, radio frequency units at every applicable tracking point and barcode label printers. Instructions are displayed in easy-to-follow steps, accompanied by installation images, training videos, manufacturing alerts and color coded station timers.

Production Scheduling Process Overview

In a non-sequenced (batch) program, the application has a production schedule entry, which determines the sequence of different variations of parts to be built, as well as the associated quantity (for example, 100 of part X, then 100 of part Y, etc.). The production quantity is validated against a multiple of the standard pack, and if a part is scrapped in the build process and the production run is not complete, the quantity will automatically increment to ensure that the run is for a complete racks of parts.

In a sequenced operation, the build order process is determined by the sequenced data from the OEM, such a broadcast pulse or an 866 EDI transaction. If needed, the actual build process can be done out of sequence to accommodate line efficiencies, and the actual sequencing of parts will take place at the time of racking.

Build Process Overview

In a typical production flow, the operator places the part in the assembly machine and scans its substrate label. After the part is assembled in the machine (for example, clips are added, etc.), the machine will cycle. This process repeats at every applicable work cell until the final station is reached. At that point in time, the EOL tester or final poka-yoke interface is performed. The finished part will then be placed in the shipping rack and be ready for scanning for verification.

PlantTalk:Build provides operator instructions for each step in the assembly process. Each instruction contains one or more of the following attributes:

- Written description of the instruction step (along with images/instructional videos);
- PLC interface to retrieve a completion bit and/or testing data metrics and to index the main assembly line;
- Tool interface to enable/disable tools and to retrieve process metrics (such as torque values);
- Scan interface to collect scanned data and validate that the expected scan values are received (i.e. the correct component part number is introduced to the assembly).
- Auto process step that will auto pass after user defined # of seconds.

The system enforces that the work instructions are completed in order and that the stations are done in order as well. It ensures that all required steps are completed for each station before the part is allowed to move into and be introduced to the next station and that all operators are logged in and authorized to work at specific stations. All scans and torques are saved to the database to provide full traceability of the instructions processed, including operator credentials, time and date stamps for all critical operations, as well as serial/lot numbers for all critical components.

This process ensures end-to-end traceability and tracking abilities through the manufacturing process. Product traceability implementation limits the impact of the cost of a product recall via automated collection of critical material and product lots. Our system stores historical product manufacturing information that can be easily retrieved on demand.

Dashboards typically deployed include the visual representation of station-by-station status in terms of the cycle times and +/- offsets from the standards with color coded escalations and alerts based on pre-defined milestones. In a broadcast sequence environment, a bank review dashboard is provided to display status against the OEM plant, taking into account shipments in transit.

Reporting is based on the Datanational User Query Tool, which provides a streamlined method of extracting data from the database that can be used for setting up canned reports. From the query tool, the data can be exported into Excel with a push of a button (via a CSV comma delimited file), or be printed to a default printer.

PlantTalk:Sequence

PlantTalk:Sequence is an integrated and comprehensive solution to the automotive sequencing requirements. The essence of automotive sequencing is for suppliers to deliver parts to the OEM just in time, and also in the proper build sequence. Depending on the manufacturer, the sequencing requirement is referred to by many different names and acronyms, such as in-line vehicle sequencing (ILVS), sequential parts delivery (SPD), just-in-sequence (JIS), etc.

Receipt of Data with Sequencing Requirements

There are a variety of communication methods to inform suppliers of the build sequence. Examples include:

- Using traditional EDI, the sequenced requirement usually comes in a form of an 866 transaction (Production Sequence). PlantTalk:Sequence imports a flat file with relevant information, extracted from the 866.
- In some instances, the sequenced build information is made available to the suppliers on the Internet, and it can be FTP'd into PlantTalk :Sequence.
- Another common way for suppliers to receive sequencing data is via a broadcast pulse directly into PlantTalk:Sequence. Usually, the pulse is triggered when the vehicle passes a predefined point on the manufacturer's assembly line (such as when the vehicle exits the paint section).

Sequence Production Options

Once the suppliers know the requirements, there are several different options to manufacture and deliver the parts in sequence to the manufacturer. These mostly depend on the nature of the product, how the products get packaged, and other factors considered by the suppliers. PlantTalk:Sequence supports both commonly used options.

Sometimes, the parts are built in batch (bulk), and are only sequenced at the end of the manufacturing process by placing the parts in proper sequence in the shipping rack, and then loading the shipping containers onto trucks in the proper sequence. Another option is to build in sequence, maximizing the utilization of floor space.

Sequence Labeling

PlantTalk:Sequence supports common part and rack labeling requirements. Usually, each sequenced part will require a bar-coded label, along with some other basic part information, such as sequence number, customer part number, etc. It is important to finalize the label requirements for each program, as they may change. Part labels can vary in size from as small as .75" x 1.5", to a more common 2" x 4" label size, or larger.

Rack labels also vary in size and specification. A more common type is a standard 4" x 6" (or 4" x 6.5") AIAG-type shipping label containing several pieces of information. The rack number, high and low sequence number, Plant ID, Line ID, and more may be included on the label. In some instances, the rack label may actually be a simple 8.5" x 11 piece of paper (without the adhesive), with or without a barcode. The label may also need to contain a grid schematic of the rack with the part numbers listed in the appropriate rack positions.

Sequence Packing, Validation and Loading Process

In addition to generating the OEM required rack sequence labels, our software includes a scanning validation process, verifying the sequences in the rack. Once each rack has been verified to be filled correctly (there is the right part number for the requested sequence in each slot), our system can be tailored to generate a production data upload file to be made available for import into ERP system.

Our application also includes the trailer load program, which ensures that the shipping racks are loaded onto trailers in correct sequence, based on the order that the OEM assembly plant requires the racks on the trailer. The trailer load is configured from a PC and then scanned, in sequence, by the RF hand held.

Based on the completed trailer load process, the Datanational system will generate a shipping file to be uploaded into your ERP/EDI system. The contents of the shipping file are normally imported into EDI/ERP to record a shipment, including the necessary inventory transactions, along with passing the data to EDI to generate an outbound 856 ASN transaction to be transmitted to the OEM. Your standard shipping process may include the printing of shipping paperwork, such as Bill of Lading and/or Packing List. Alternatively, our software can print a summarized BOL report that could be used as a packing list.

PlantTalk:Pack

PlantTalk:Pack is a comprehensive on-demand labeling and packing validation system. It supports the automated container label and pack list printing based on standard packs. It also provides the validation of the unpack/repack process. Our system is scan-enabled to support packing of the parts into the final shipping containers to ensure that the correct part and quantity is being packed. The system provides the ability to allow containers to be configured as needed (by customer, by load) to ensure the flexibility of the container loading process, while still providing the full scan validation of the finished load.

The packing application provides the required validation that only a single part can be packed/ scanned into a single container. When the rack is full, the operator scans all of the parts that are in the rack. If all are the same part number, and the standard pack quantity is met, the proper shipping rack label will automatically print from your ERP, based on the part setup information in the application and the file upload.

As an optional add-on function to PlantTalk:Pack, we can also implement on-demand labeling to print barcoded serialized part labels. These can be triggered via a PLC interface, touch screen interface or a scanner trigger. Once the parts are uniquely labeled, they would then be scanned into your containers.

Datanational's PlantTalk:Pack software is tailorable to deliver on the automated finished goods container labeling and timely production reporting into your ERP based on the direct triggers from the PLCs from the production machines. If an output file receipt from the PLC is not feasible, for the PLC communications with an applicable machine, we will define the scope and the software tools & hardware required to establish the communications.

Automated Production Reporting and Production Dashboards

Datanational's PlantTalk:Pack software can also be tailored and deployed to deliver on the automated finished goods container labeling requirement and provide timely production reporting into ERP. At a high level, the following process steps are put in place to accommodate this flow:

1. Using a PC workstation or a Windows tablet, the production supervisor will set up the line after they have completed running the test/sample parts but before the start of the full production run for the part. This password protected option provides for the entry of the following fields:

    - Department
    - Resource #
    - Production Employee # (optional)
    - Any additional required information

This application setup function can also be performed ahead of the production setup phase, and then the supervisor switches to Run mode once the setup testing has been completed.

2. Once the Run mode has been activated, the PLC interface will be turned on, collecting the production triggers from the resource (such as a press or an injection molding machine).
3. The PlantTalk application will send a record to the ERP system to record production for the scanned part, or based on the PLC triggers.
4. Upon reaching the standard pack value for the part, a specific ERP event code will be used to trigger the generation of a container label from the ERP system.

A production status dashboard is continuously updated and refreshed to reflect the current status of each resource, color coded by their run state (running/down/setup mode). The dashboard can be tailored to display relevant data by resource, such as Work Order number, run rate, part number, etc.

PlantTalk:Kanban

PlantTalk:Kanban software module provides for capability for your shop floor to manage inventory to ensure parts used in the build and assembly process are replenished line-side in a timely fashion and are delivered to the correct station for your build process. The System is used to automate the fulfillment process of picking and replenishing the line-side inventory through automated notifications, controls and part validation.

- Fully integrated with PlantTalk:MES.
- Barcoding and scanning to validate parts being picked and replenished to the assembly line.
- Zone Identification to control Hi Lo driver's time management for required parts.
- Color identification to trigger "hot" or high priority parts.
- Tablet and/or monitor screen visuals of zones that have in stock and need desired parts.
- RF handhelds for scanning and validation.

Hi Lo Drivers Efficiency

With the PlantTalk:Kanban solution in place, inventory replenishment has become more efficient and simple. Rather than your Hi Lo drivers spending countless hours circling the floor looking for parts that are beginning to run low, you now are in control of the parts needed with automation. The program requires zones in which your drivers will only pick from their given zone rather than driving around throughout the day looking for stations that need parts. Your Hi Lo drivers will now know what is needed and where the parts destinations reside. Not only is the shop floor more efficient but you would be also amazed to find what the savings in fuel for each Hi Lo will become over a year's span. Wasted time on the shop floor is now obsolete.

Inventory Tracking

Think of this solution as a constant reminder at the touch of your fingertips to allow for more efficient inventory stock levels on a more consistent basis. With a new PlantTalk:Kanban interface using a Windows tablet attached to the Hi Lo or by PC at a station, this interface becomes custom to fit your shop floor as the solution is able to notify your drivers for "hot" parts, meaning parts that are hitting their minimum stock levels. Through the validation process, the solution keeps track of how many parts are being consumed, taking into account part quantities needed for the next build process. This will allow for notifications and alerts to be sent to your drivers well in advance to running out of the desired parts for the line.

Replenishment requests can also be made by the line-side operators from their build stations. Once a request for replenishment is made through a touch-screen interface, a selection of eligible parts is displayed (based on the station setup) and the operator chooses which one(s) need to be delivered to the line. The application also provides for integrated messaging for line-side assistance (Call to Help).

PlantTalk:PLCconnect

Datanational's **PlantTalk:PLCconnect** module provides for monitoring of your machine activity through a PLC interface. PLC interfaces with PlantTalk:MES are established using a variety of common middleware tools, including RSLinx, Kepware and I/Gear. Monitoring for errors and production statistics can include the collection of basic production data such as the part number, quantity, run time, work order number, release and operation sequence. We can trigger events and update the software based on completed activity (such as cycle complete) or schedule the next machine event to take place after a required predecessor event has taken place (such as a correct scan).

PlantTalk:PLCconnect includes a basic visual monitoring display for PLC bit activity. The application is also capable of generating and sending SMTP messages (e-mails), based on user-defined triggers (such as error conditions).

PlantTalk:ContainerTrack

If you own your returnable containers, you take great interest in knowing that all of your containers come back from the customer site and are introduced back into the scheduled delivery rotation. The replacement of "lost" containers can be very costly, especially if you can't easily come up with the tracking information in response to your customer's inquiry. Without solid container tracking data, you are often left in a position to cover the entire cost of container replacement.

PlantTalk:ContainerTrack can be implemented using the traditional data collection methods (barcodes and barcode scanners) or by using Radio Frequency Identification Tags (RFID). In a traditional barcode scanning environment, the system includes scanning and capturing the unique Container ID's with every shipment and scanning them again as they are received back from the customer or your other locations. In an RFID environment, each applicable container (or other asset) is tagged with a unique RFID tag. Each entry/exit dock door is installed with a fixed RFID reader. The system is designed to record an "out"movement of the asset if its present location is that particular site. If the RFID fixed reader reads a tag that is not associated to that location, it will be recorded as an "in" movement. Each read of the asset RFID tag is date and time stamped.

Datanational's proven PlantTalk:MES implementation methodology has been highly successful in our past projects. Our continuous exposure and hands-on approach with mission critical projects has dictated the development and growth of our company. These factors have directly contributed to our position and attitude towards selfless dedication to our customers and our ability to maintain long-term relationships with them.

PlantTalk:MES is supported by Datanational's support and development team around the clock, 24 x 7 x 365. As your one-stop shop for innovative business solutions, this system is field tested, customer endorsed and positioned to help you meet today's growing business demands as well as those of the future.

We are practical problem solvers.
We make customer challenges, our challenges.
We are more than just an MES Service Provider,
we are your Technology Partner.

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