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CROSSROADS OVERVIEW

Crossroads is a Manufacturing Execution System that enhances your **SSA Global ERP system** to improve production efficiency and quality, decrease paperwork and associated clerical time, and provide real time information to management, vendors, and customers.

Information to the Worker:	Crossroads makes up-to-date order, inventory and process information from the ERP System readily available to workers on terminals near their work areas.
Production Data from the Worker:	Crossroads collects labor, production, and material consumption information from the shop floor via touch screen PC's, bar code scanners, scales, and PLC's.

Crossroads Build Module

Data On Line	“Data” in your ERP system becomes “information” that the workers can use to accomplish their work through the Build module. Crossroads translates the planning data and displays it by work center, department, operation, order, priority, date or other form that is most helpful for the factory floor.
Electronic Scheduling	Workers select jobs from the lists displayed on the screen with the full knowledge of other tasks waiting to be done and up-to-date information about work already completed. Tasks assigned and prioritized by the ERP system can be rearranged and reassigned on Crossroads screens based on real-time considerations on the factory floor.
Immediate Updates	When a worker jobs-in to an operation by selecting it on a screen, Crossroads sends a time-stamped transaction to the enterprise system. When a job-out is performed and production is reported, other time stamped transactions (labor and inventory) are sent to the ERP system to record the completed work.
Labor and Production Reporting	The Build module provides a simple way to record labor and production on specific jobs via a touch screen interface.
Labor Balancing	At the end of the shift, the sum of the direct work hours and the indirect time will automatically match the total time between badge-in and badge-out.
Display Online Status of All Work Orders and Operations	In addition, this functionality provides online status of all work orders and operations scheduled for manufacturing. Supervisors can see the status of up-stream processes that will be providing parts to a scheduled operation.

Crossroads Display Module

Display Supporting Documents	Adding the Display module lets Crossroads display data that might otherwise be delivered in a printed packet. Workers can press a key to view documents such as: <ul style="list-style-type: none">• CAD drawings• Manufacturing instructions• Quality and Compliance documents• Setup instructions• Multimedia displays of setups and processes
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The information is up-to-date and available at any location including multiple locations if a job is split.

Messages Electronic mail messages can be delivered automatically when an employee badges in or out. Messages could contain information about meetings or schedule changes, or could direct the worker to report to a different work location. Supervisors can send messages to all employees or to individual employees.

Crossroads Parts Module

Parts Availability The **Parts** module provides a detailed view of the parts quantities at factory floor stocking locations. Workers can determine whether to request all the parts for an order or only enough to start the work based on the quantities of materials ready or available. Crossroads downloads part quantities from the inventory system and updates the quantities as work is reported.

Moving Parts Moves are requested and recorded. Crossroads generates part quantity updates to the inventory system whenever workers report an activity that moves parts into or out of a location tracked by that system.

What-if Analysis The Parts module can help perform a "what-if" analysis to solve a parts shortage problem.

For example, there may be several different operations all requiring the same part. Not enough parts are available to do all of them. A supervisor can try assigning the available parts to selected operations to see the impact on production. He can choose which operations to start first while deferring others until the parts become available. By testing several alternatives, a combination can be found that will keep production moving while satisfying as much of the production plan as possible.

Electronic Kanban The Parts module contains a Kanban database that maintains values for Kanban quantities (calculated and actual), pull sequences, and points of use for each individual part #. By scanning a bar coded Kanban card, requests are made to the correct point of re-supply to replenish the stock at the Kanban location. These include creating purchase order releases, new manufacturing orders, or requests to material handling.

Planned Order Support The number of work orders generated by the ERP can be drastically reduced if work orders are generated frequently for the same products. This function allows MRP to feed a blanket work order with new quantities as required, minimizing the order maintenance function substantially.

Crossroads Web Module

Connect Remote Sites In a multi-plant environment, remote plants may be connected to a centralized Crossroads/ERP System via the Web.

Online Production Control Management can check production in terms of good vs. scrap, direct vs. indirect, and % efficiency from the Web. The status of every job is also available.

Supply Chain Connection Outside vendors that perform operations (i.e. plating) can report their production directly into your system via the Web.

Customer Information Customers can see the status of their orders right down to the completed steps in manufacturing via the Web.

Crossroads Connect Module

- Scale Interface** Weight information from scales can be automatically collected and sent as production data to the ERP
 - Machine Interface** Production and/or scrap data may be acquired from counters, PLC's, or other machine interfaces. Uptime/downtime status may also be collected in this fashion.
 - Bar Code Labels** Information collected via Crossroads (i.e. weight, length) may be combined with ERP data (i.e. work order, operation, lot #) and printed on bar code labels.
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STRATEGIES FOR MANUFACTURING

Refining the Production Planning Process

Simplifying the Information Flow

Workers Need The Data Generally, the information you need for efficient production management can be maintained in your Enterprise Resource Planning System. The challenge lies in getting the information to and from the workers. Some of the capabilities of your production and inventory systems may not ever have been implemented because the workers could not have access to the entire plan, or the plans were inadequate because the production data from the factory floor was incomplete or inaccurate.

Crossroads Moves The Data Crossroads does not replace your production and inventory systems, nor does it create additional data. Rather, it facilitates delivery and presentation of the data where it is needed. You can tailor Crossroads to support your way of doing business by making better use of the planning and production tools you already have.

Timely And Accurate Production improves because the planning system and the shop floor are working with timely and accurate information.

Show the Worker All the Data

Less Paper Traditionally workers receive orders in the form of printed shop packets, printed reports and verbal instructions. As you implement Crossroads functions and features, you are reducing the paperwork on the shop floor..

Show Orders and Operations From The Planning System Crossroads downloads orders and operations from the planning system. You will set tailoring options to determine how far into the future the orders will be visible. The horizon you select will depend on your confidence in the forecasts and the planning process balanced against the benefit of having more orders to consider when rearranging jobs.

What Jobs To Do The Build Module allows supervisors to preview the job queues, assign and reassign operations to work centers, and reprioritize work based on the downloaded plan and on the real conditions in the factory. Workers will see the changes in the job queues immediately if they work from job lists on terminals instead of drawing jobs from a stack of shop packets. Verbal instructions will be reduced. For those cases where additional instructions are needed, the message facility in the Display Module delivers messages to workers electronically and confirms that the message was received.

How To Do Them The Display module displays the operations, drawings, bill of materials, and special instructions associated with a job. It replaces the printed shop packet that would otherwise travel with the work. While paper shop packets can be damaged or misplaced, the Display module is always available. Unlike the paper document, the Display module can be accessed from terminals anywhere in the factory at any time. **Special Note – Crossroads easily prints “travelers” to go with the job materials.**

When you plan for Display, you must determine what information you want to make available. Touch screen PC’s provide an easy-to-use interface for shop floor workers. Crossroads is easily configured to call the appropriate display program for special compliance documents. You can choose to implement Display in stages beginning with electronic messaging, adding the other features as time and budgets allow.

Manage the Inventory Crossroads tracks parts at all stocking locations, including departments, work centers, and machines. Crossroads also supports lean manufacturing applications with an Electronic Kanban System that streamlines part movements.

Provide Simpler Data Input From the Factory Floor

Accurate and timely production data is vital to keeping planning and scheduling on track. Crossroads improves the data gathering in several important ways.

- Touch Screen Support** Crossroads makes full use of touch screen technology for easy use by factory personnel. Touch a button and see a schedule, work instruction, quality document, drawing, or parts list.
 - Improved Accuracy** The jobs on the screen always reflect the most current view of assignments and priorities. For example, an operation which has been canceled or rescheduled will not appear and cannot be selected.
 - Read from a Scale** Sometime production reporting is most easily done by weighing the product. Crossroads supports interfaces to every major scale type on the market. Crossroads also has a pre-built kitting application for small parts bags.
 - Connect to PLC’s** Crossroads talks to PLC’s to acquire downtime information, production rates, quality information, and more.
 - Scan From A Bar Code** Bar code entry is also supported. One of the most common items is the employee badge number. Also, work orders, indirect accounts, scrap reason codes, Kanban cards, etc. may all be bar coded.
 - Keyboard Entry** Workers may key in certain specific types of data. These could include items such as quantities completed or notes about a job or a process. This direct keying eliminates illegible or lost hand-written notes and the errors introduced by data entry clerks.
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Improving Shop Floor Management

Empowered Work Force

Productivity improves when the work force has the power to respond to changes. The production plan shows what work needs to be done, but the shop floor has immediate challenges such as breakdowns, faulty material and absences that require adjustments in work assignments to meet the plan.

- Electronic Scheduling** Crossroads gives workers immediate access to changes in the plan. Rather than working from a printed schedule that was produced last night, workers see updated schedules throughout the day on their touch screen terminals.
 - Downtime Reduction and Analysis** Supervisors can respond to problems quickly. Jobs can be immediately reassigned to another work center in case of a breakdown and Maintenance can be notified.

Downtime reasons can be easily collected and analyzed for process improvements.
 - Immediate Notification** A job that has been moved immediately disappears from the list for the original work center and appears in the list for the other. Supervisors can send notes to the workers informing them of important schedule changes. All the information to make a production change is immediately available to everyone who needs it. When the job gets moved, the parts requirements also get moved. A transportation request can be made to move parts to the newly assigned location if needed. Workers and supervisors can tell if the parts are already available at the new work center so work can begin.
 - Capacity vs. Load** Supervisors have an up-to-date view of the work load and work centers. Work can be easily shifted to work centers with spare capacity based on current conditions. Job-in and job-out actions by workers are logged immediately in Crossroads so supervisors can see what jobs are currently being worked at each work center. Workers report job steps complete as they finish them so that work can move to the next step without delay.
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Paperless Environment

Crossroads provides paperless functionality as determined by the client, but it does not preclude the use of paper documents if required.

- No Obsolete Documents** Because the data remains in the system, changes are available instantly at all terminals. No obsolete plans or orders are circulating on the floor. None of the production data will be hand written on printed documents where it can be lost or destroyed.
- Second Language** Crossroads supports second language documentation. Information can be presented on terminals in the language best for the worker.
- Recorded Notes** Notes are recorded in the system. Workers can log notes about production problems or send messages to downstream processes about special concerns such as setup problems. The notes are saved permanently with the orders. They are legible and traceable, and they are available for data analysis while studying shop floor processes.

Timely Activity Recording Activity is recorded directly in the system. Workers report operation completion directly at a terminal. They report the quantity produced and scrapped, while the system records the date and time of completion and updates the parts quantities. Data input is validated at entry time. Quantity values are legible and are immediately available for review and reports. Data is passed to the enterprise system almost immediately.

Crossroads reduces or eliminates the need for data entry clerks to read, interpret and enter data values hours after the work has been done. This reduces data errors significantly.

Make Changes Based On All the Facts

Real time changes in production are unavoidable. Crossroads helps workers and managers make those changes most effectively based on all the facts.

Adjust For Capacity Problems Work can be reassigned to other work centers as soon as a problem becomes known. If a machine breaks down or an employee becomes ill, the supervisor can immediately review the work assigned to that position, look at other work centers for capacity and reassign the jobs based on all the facts.

Adjust For Schedule Changes When jobs must be rescheduled because of customer requests or unexpected changes in plans, supervisors can immediately see the impact of the change and determine where capacity exists to handle the change.

Adjust For Shop Floor Conditions Parts may not yet have arrived at the work location for an assigned job step or a tool may not be available for a setup. Workers can review the work list online and select another job that can be started without delay. The delayed job remains in the queue where it can be selected when the problem is corrected. The system will record the fact that the other job has started so supervisors and the planning system will have accurate information.

Adjust For Process Problems An operation may produce a particularly high scrap rate because of material or machine problems. The problem will be logged into the system as soon as the worker reports production. Immediate adjustments can be made to production plans to accommodate the problem. Downstream steps can be delayed until rework or another production order produces enough good parts to start the next step. Workers will not waste time setting up for a job that can't be done because of upstream problems.

A More Effective and Responsive Shop Floor

Traditional methods assume that the work on the shop floor is anywhere from not started to complete. Production changes based on those assumptions will inherently be faulty. Crossroads gives the work force a detailed factual view of everything on the floor right now. Changes based on these facts make a much more effective and responsive shop floor.

PREPARING THE DATA

Crossroads adds valuable functionality to your production process. It works with your existing ERP System and other systems such as payroll. Implementation requires a careful analysis of your existing systems and procedures.

Map the Data Flow Requirements

Pre-Existing Interfaces Crossroads works with a variety of enterprise systems including:

- ERP's (i.e. BPCS, Baan, PRMS, MAPICS, Movex, Friedman, etc.)
- Advanced Planning Systems
- CAD Systems
- Payroll Software or Services
- Warehouse Systems

Define the Data Format Once the data sources have been identified, you will define the data formats. Every company has unique data requirements. Some data fields may not be populated, different sets of codes may be used, or different processes may be used. Crossroads is tailored for your specific data.

Mapping the Data Crossroads personnel will map data from your systems to Crossroads data storage areas. In most cases, standard data maps from ERP's will already be available.

Extra Tables You may not have implemented some features such as employee badge tables in your enterprise systems. Crossroads can support some of these additional data files if needed. A simple generic table will be created and maintained in the download directories of your enterprise system. Crossroads will download data from the tables as though it had come from the enterprise system.

Data Storage Crossroads stores all data that it collects in a history file. You may query this file for information not readily available through the reporting functions of your other systems.

Run the Interface

The Download Download programs extract data from the enterprise system and update the Crossroads records. Download programs for SSA Global ERP's (i.e. BPCS) are already available. These download programs can be enhanced with information unique to your company.

The Upload Crossroads generates update transactions for your enterprise system. Once again, pre-existing uploads are available for most SSA Global ERP's. Also supported are multiple databases for quality applications

IMPLEMENTING CROSSROADS

This page describes what you may typically expect to do to install and initialize Crossroads in your company.

- Setup The Computer** You must have an AS/400 or NT/Windows 2000 Server where you will install and run the software. You can run Crossroads on the same computer that runs your enterprise system, or you can use another server that is networked with the enterprise system.
- Place Terminals** You must have terminals in place for your workers on the shop floor. These can be dumb terminals such as the 5250 series or touch screen PC's. If you will be using bar-codes at some locations, a bar-code wand or wedge must be attached to those terminals.
- Receive And Load The Tape** You will receive a CD containing the Crossroads software with loading instructions. The loading process will build directories, copy the files and compile the programs. The tape includes README files containing instructions, documentation and last minute information.
- Training Course** Your implementation team will receive a 2-day hands-on Crossroads training course. This course will educate you on all Crossroads functionality in detail.
- Tailor The System** The system will be configured using tailoring screens as described in the README documentation. The instructions provide guidance for setting flags for features you want to enable, data options specific to your company, and processing options for your specific operating needs. A printed Implementation Planning Guide is available in addition to the most current instructions from the file on the installation tape.
- Set Security** Security levels will be set for the users so they can access Crossroads.
- Load Reference Data** Data will be loaded into some of the reference files following instructions in the README file. For example, if you need to use the Crossroads provided substitute badge file, badge numbers will be entered.
- Initialize The Database And Test Downloads** The download process will be run to initialize the Crossroads database. This will test the download programs and make sure the data mappings are correct for your particular systems. When the data is satisfactory, it may be used for training or for production.
- Test Transactions And Uploads** When users begin generating transactions, the upload process will start. After it is determined that the transactions are satisfactory in the enterprise system, you may begin using the system.
- Start Production** When the system is turned on for production, you will set up scheduled jobs on the ERP processor for downloads and enable the upload programs for normal operation.
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