

OpreX™ Transformation

## OpreX Batch Solution

Integrated Control and Management  
Solution for Batch Plant



For **3** Challenges

Cost Effectiveness...

Time to Market...

Production Quality...

# OpreX™ Batch Solution

Yokogawa provides superior control and management solutions for batch process manufacturers, minimizing integration efforts by executing both the process control system (PCS) and the manufacturing execution system (MES) elements as a consolidated single project.

# Challenges in the Specialty Chemical, Pharmaceutical, and Food & Beverage Industries

In many areas of the specialty chemical, pharmaceutical, and food & beverage industries, product lifecycles are becoming shorter and greater product variety is needed. Batch manufacturers are challenged to rapidly develop and deliver new products while maintaining stable operation.

## Challenges for market delivery of new products:

Market demands result in reduced product delivery lead times.

Change requests for batch processes are rising and increasingly complex.

Correctness of application changes must be guaranteed.

Knowledge accumulation is difficult due to a scarcity of subject matter experts.

## Challenges for stable operation:

Potential errors associated with manual operations are difficult to identify.

Root causes of quality variations between batches is not clearly traceable.

Validation for manufacturing consumes significant time.

Data may be available but not readily utilized for production improvement.

Yokogawa supports batch manufacturers in their efforts to solve these production challenges, by deploying the OpreX Batch Solution.

# OpreX™ Batch Solution

Yokogawa's new OpreX Batch Solution is created for batch manufacturers faced with the problem of how to efficiently integrate both PCS and MES operations. Encompassing all phases from design through maintenance, OpreX Batch Solution efficiently eliminates overlapped work between PCS and MES, effectively reducing human error possibilities by addressing both automated and manual operation issues. Reusable PCS and MES applications based on Yokogawa's deep knowledge further reduce required cost and time.

OpreX Batch Solution supports batch manufacturers over the entire plant lifecycle, from design and engineering, into actual operation, through modifications, and onward to any expansion.

## During the design and engineering phases,

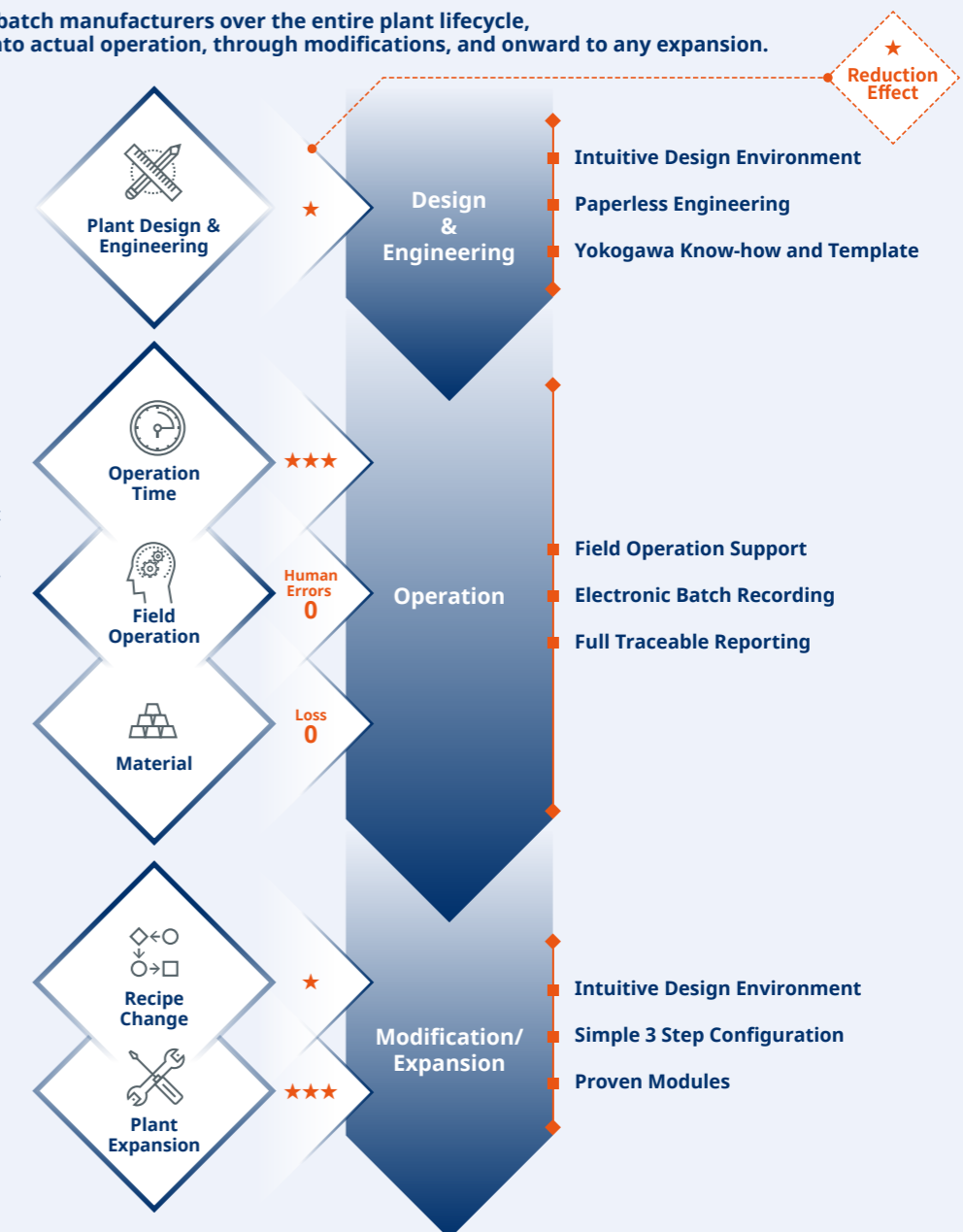
Yokogawa offers an intuitive design environment, paperless engineering methods, reusable applications, and access to know-how. These benefits contribute to reduced cost and minimized overall system implementation effort.

## In the operation phase,

batch manufacturers can optimize not only the automatic PCS operation, but also field operator manual operations, with both records integrated into one batch report. Using data analytics technology, batch manufacturers and Yokogawa collaborate to identify problems, create action plans, and apply solutions.

## For modifications and plant expansion phases,

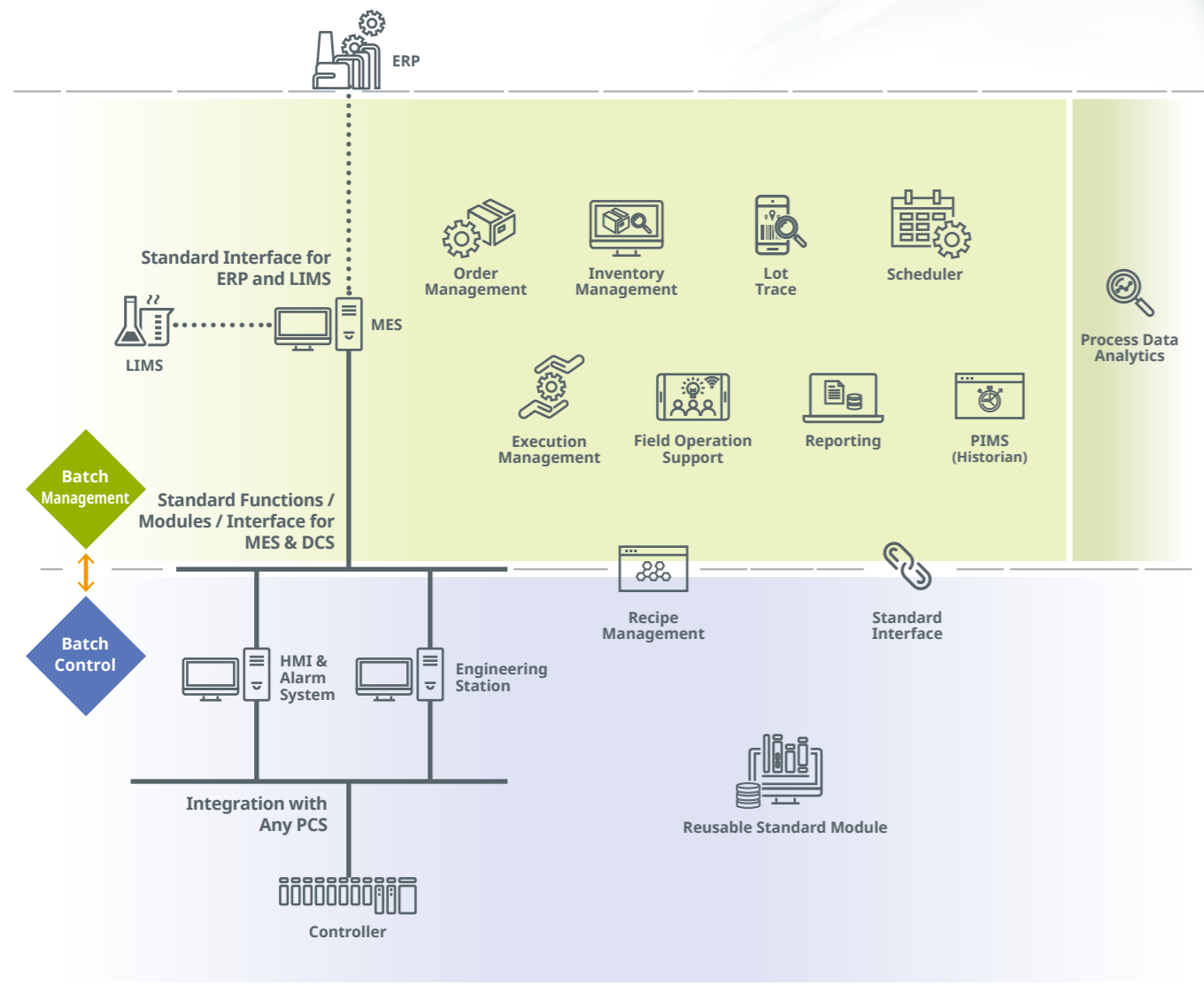
engineering work is dramatically reduced by using the intuitive design environment and taking advantage of reusable, proven modules.



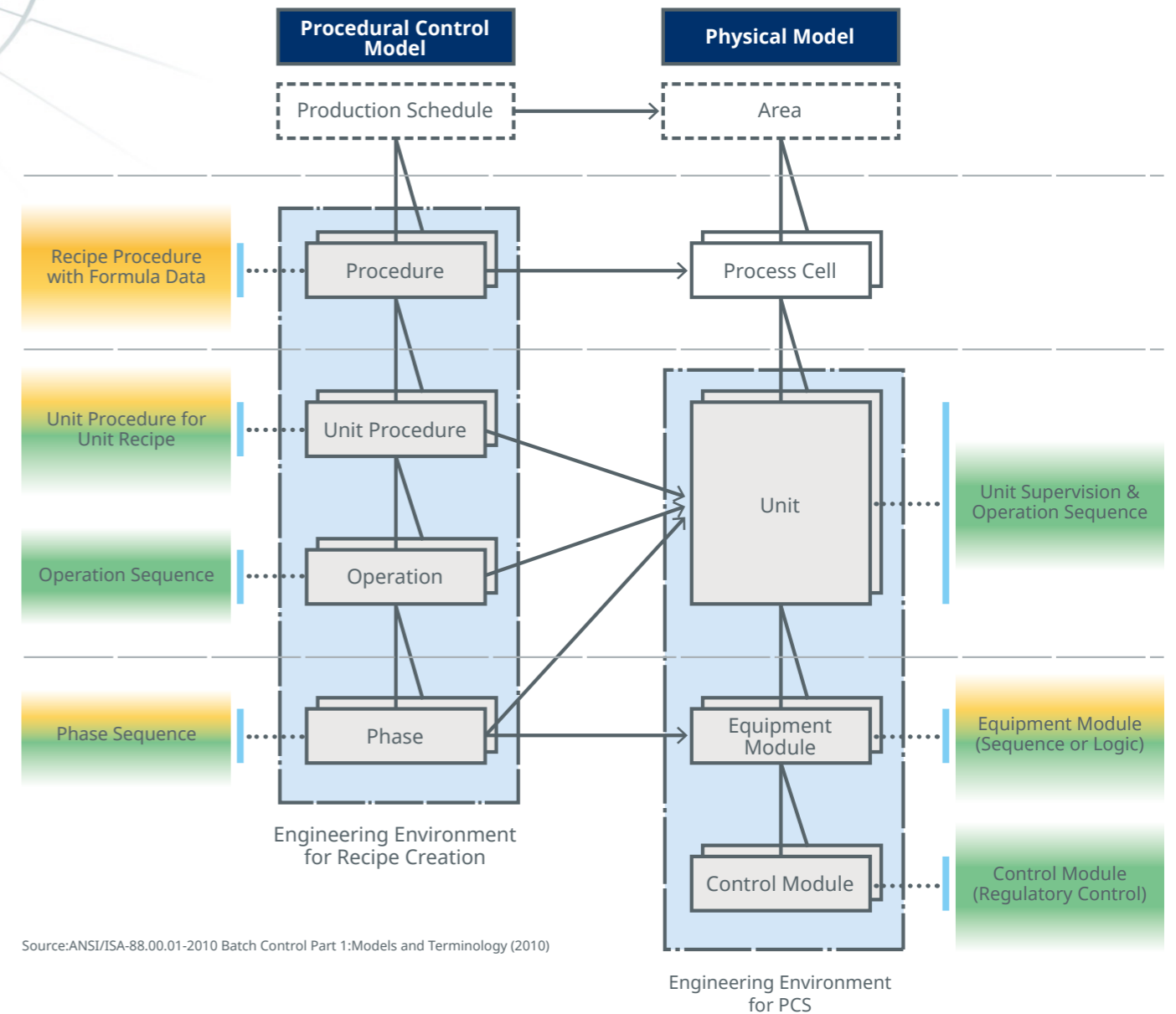
## Scope of OpreX Batch Solution

**OpreX Batch Solution integrates the key features of PCS and MES for any batch process plant. In addition to typical PCS operation, most batch plants require batch management MES functionality for production scheduling, dispatching, recipe management, field operation support, and electronic batch recording.**

As indicated in the diagram below, OpreX Batch Solution is aligned with the ISA-95 Enterprise-Control System Integration standard and incorporates all necessary functionalities required by batch processes.



OpreX Batch Solution is aligned with the ISA-88 Batch control standard as well. The Procedural Control Model of procedures, unit procedures, operations, and phases is developed in an engineering environment compatible with recipe creation. The Physical Model of units, equipment modules, and control modules is designed in an engineering environment compatible with the PCS. Reusable modules for contents of procedural control models and physical models are available for efficient implementation.



Source:ANSI/ISA-88.00.01-2010 Batch Control Part 1:Models and Terminology (2010)

## Type of Usage of Modules



# OpreX™ Batch Solution

With OpreX Batch Solution, Yokogawa provides ways to deal with these challenges.

## 01 Cost Effectiveness...

Enable efficient plant/process design, implementation, and operation to improve cost effectiveness.

## 02 Time to Market...

Reduce time to market to deliver new products faster, addressing the requirement for shorter product lifecycles.

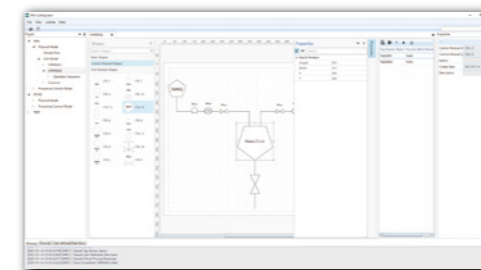
## 03 Production Quality...

Improve production quality to deliver the best possible products to end users, even while surrounding conditions are changing.

Detailed approaches  
for dealing with your challenges  
by using OpreX Batch Solution

## Value 01 Increase Cost Effectiveness

OpreX Batch Solution increases cost effectiveness by delivering high production quality through a simplified and compressed PCS and MES design process, along with improved MES execution management.



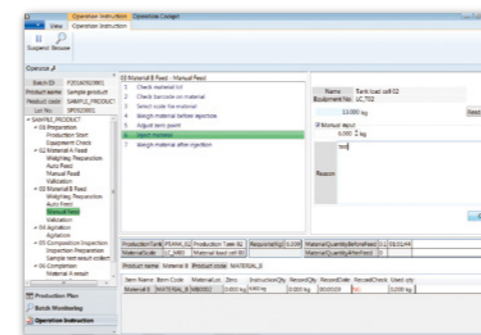
### Simplified and Compressed PCS Design and Engineering

OpreX Batch Solution provides essential functions to simplify and shorten the duration of PCS design and engineering, including

- Reusable standard modules: Minimizes development effort and maintains engineering quality for batch process design and recipe creation.
- Discussion tool for design with batch manufacturers: Users can design applications and check their functionality, with no programming knowledge required. These and other capabilities simplify creation of documents, such as User Requirement Specifications and Functional Design Specifications.

### Simplified and Compressed MES Design and Implementation

Yokogawa cultivates and captures know-how using MES templates. These provide typical MES functions, contributing to shorter time for MES design and implementation. These templates cover typical MES functions: recipe management, order management, inventory management, execution management, field operation support, reporting, and lot tracing—while providing integration with related systems.



### MES Execution Management

The Yokogawa MES solution supports improved quality, cost and delivery (QCD) in production by ensuring there is less human error and reduced material loss.

- Standard Operating Procedure (SOP) management: Shows SOPs detailing all field operations to ensure defined actions are performed.
- 4M condition display: Displays the four most important production elements: huMan (operator), Machine (plant asset), Material (raw material), and Method (production method).
- Field operation navigation and barcode identification: Confirms efficient and accurate manual operations.

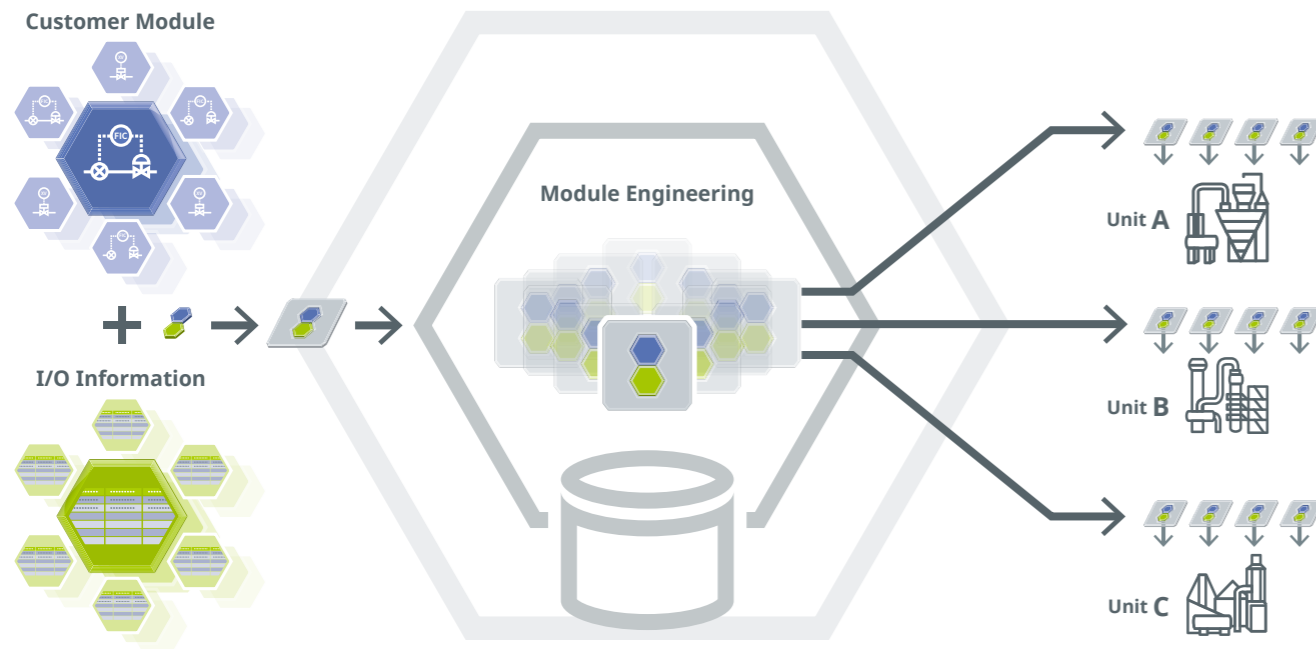
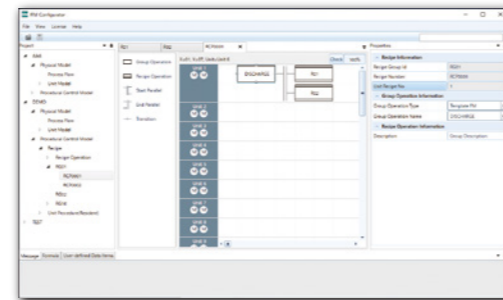
## Value 02 Reduce Time to Market

OpreX Batch Solution helps reduce time to market by facilitating easy recipe changes and simplified plant expansion, along with integrated batch reporting.



### Recipes Changes and Plant Expansion

A fundamental concept of OpreX Batch Solution is flexible recipe and formula changes, with a graphical approach based on reusable proven modules to simplify recipe engineering work. With the proven value of Yokogawa's PCS engineering environment, plant expansion engineering effort can be dramatically reduced. Thanks to module-based engineering, only I/O information changes or additions are needed for plant expansion, avoiding extensive coding and other significant modifications.



### Integrated Batch Reporting

OpreX Batch Solution can record both PCS and field operator manual operations and document each by issuing an integrated batch report. All operations are defined in a single development environment during the engineering phase.



## Value 03 Improve Production Quality

OpreX Batch Solution helps improve production quality through three approaches: improve PCS operation, improve field operation, and analyze operational data.

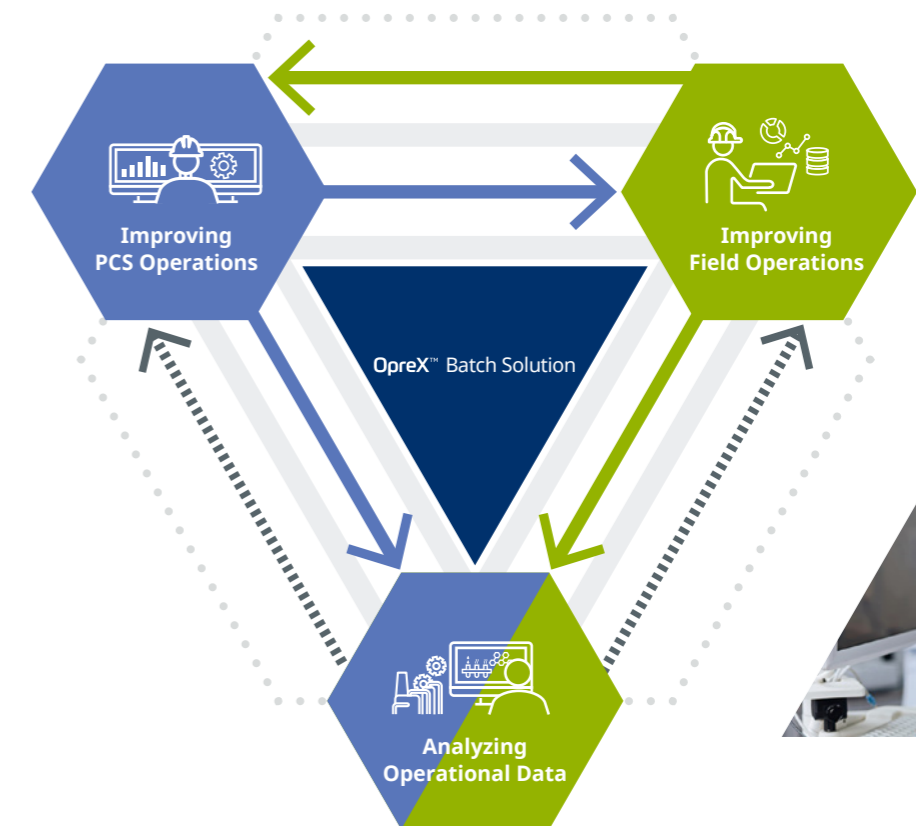


### Improve PCS Operation

With OpreX Batch Solution, Yokogawa provides critical process parameter (CPP) monitoring by batch report to compare production batches with a previously baselined "Golden Batch". Operators can maintain best production quality by monitoring CPP status.

### Improve Field Operation

OpreX Batch Solution provides clear system instructions to support field operators, improve the efficiency of manual operations, and reduce human error. Even if field operators make mistakes, they are notified and directed as to how to correct each one before going to the next step.



### Analyze Operational Data

Yokogawa provides data analytics solutions and services to improve production quality. Using batch manufacturers' process data, operational data, and process knowledge, Yokogawa can leverage strengths in analytics and measurement/control in a collaborative approach to identify problems and create action plans, improving quality and productivity.

## OpreX™ Transformation



## OpreX Batch Solution

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**OpreX™** Through the comprehensive OpreX portfolio of products, services, and solutions, Yokogawa enables operational excellence across the enterprise.

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