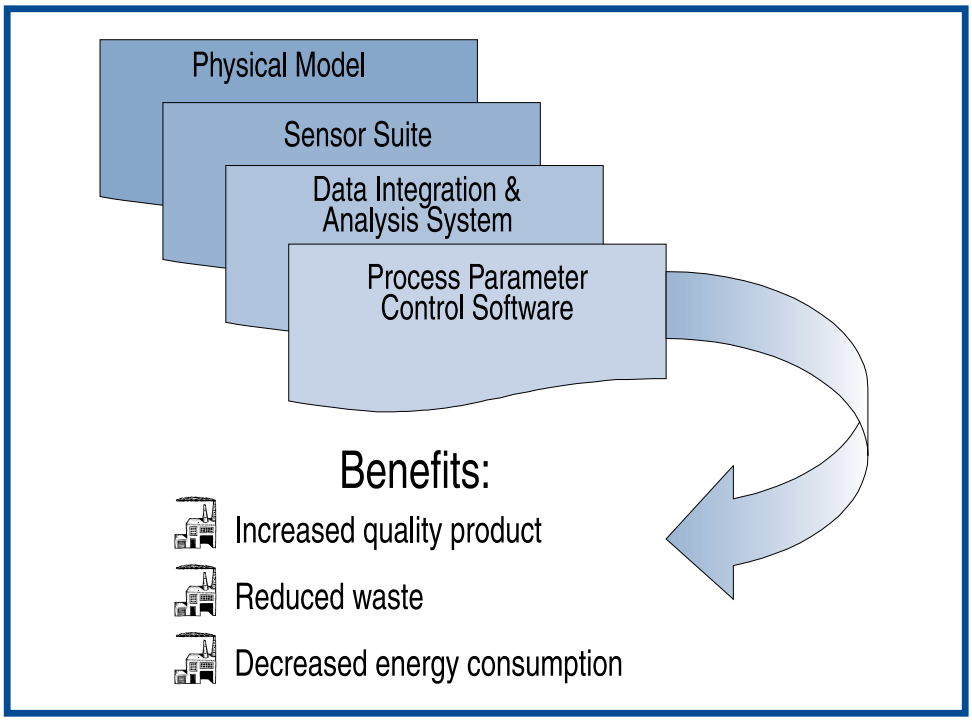
Advanced Process Control for Glass Production

Control System to Reduce Production Waste Would Lower Energy Consumption

A significant fraction of the formed glass produced in a television glass plant must be remelted due to poor product quality. As a result, television glass production requires much more energy and produces more pollution in the form of gaseous emission than would be the case if improved quality control measures were implemented. Minimizing waste production would save significant energy, reduce emissions and decrease production costs. Pacific Northwest National Laboratory and Thomson Consumer Electronics conducted a project to develop and implement an advanced process control system that would reduce waste and energy consumption by increasing the amount of high quality product from the initial manufacturing step.



Integration of unique technologies offers valuable benefits to all industry segments.

Benefits for Our Industry and Our Nation

- Improved production efficiency and quality product yield based on significant reduction of glass waste
- Decreased energy consumption due to less remelting of poor quality product
- Advanced modeling capability that will allow faster introduction of new products

Applications in Our Nation's Industry

Upon successful demonstration of the process control methods, the new control system may be applied to other industry segments, including flat and container glass.

Project Description

Goal: Develop and implement an advanced process control system to decrease waste in the glass manufacturing process, thus reducing energy consumption and increasing production efficiency and yield.

The system will integrate the following four innovative technologies:

1) A physical model that relates process parameters (e.g., temperature, deformation, cooling rate) to final product quality
2) A suite of novel, three-dimensional stress and temperature sensors for measuring process parameters
3) A system for integrating and analyzing data from a variety of sensors
4) Cognitive control software for adjusting the process parameters to maintain product quality.

The system is initially being developed to control the process of forming television glass panels at the Ohio plant of Thomson Consumer Electronics.

Progress and Milestones

Developed and demonstrated methods for temperature and stress measurements for use in television glass production.

Developed finite element numerical model for the cooling stages of television panel glass forming. Model code calculations were performed with

variations of forming/annealing time, initial gob temperature, and convective film coefficients.

The project concluded in 2002.

Project Partners

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