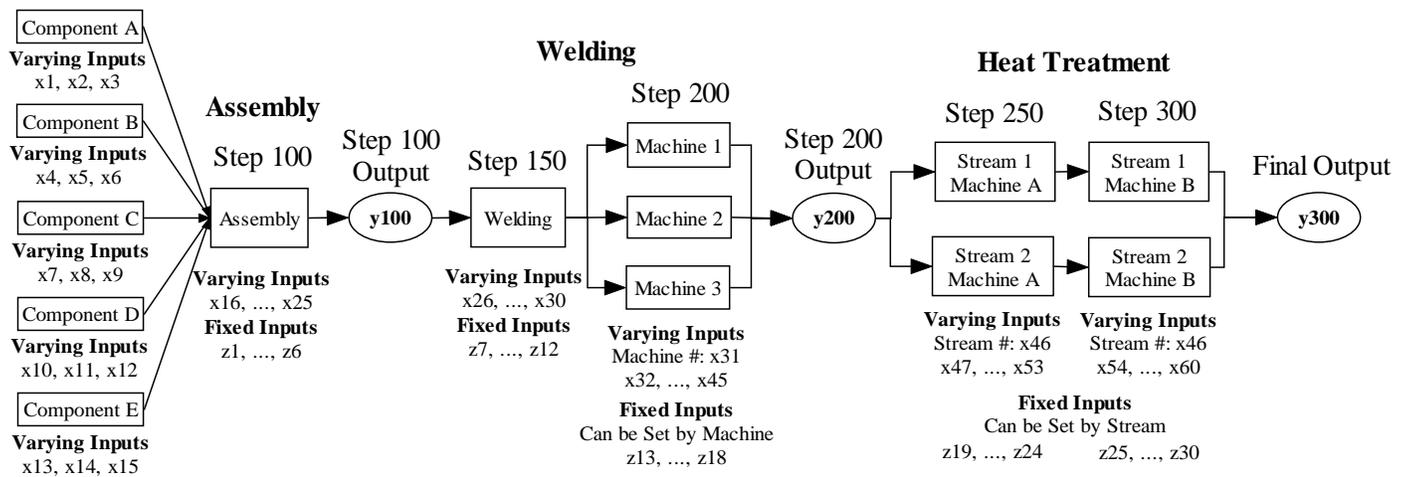


# Watfactory Virtual Manufacturing Process

## Components



The Watfactory virtual process simulates a manufacturing process for automobile camshafts and has a number of processing steps and many inputs – see process map above. The process has 60 inputs that vary in regular production (x1, ..., x60) and 30 inputs are normally fixed (z1, ..., z30). A web interface allows a wide variety of process investigations including many types of observational and experimental plans.

This virtual process has been used successfully for a number of years to teach process improvement and variation reduction techniques and methodologies. In the class or workshop each team (assigned a different version of the virtual process) is required to plan and analyze a series of process investigations to first learn about how the process works (e.g. identify important inputs, find the nature of the output variation, etc.) and ultimately how to reduce variation in the final output (y300). Also, to simulate reality, teams are given a budget and information on costs associated with different investigations. Both university students and industrial personnel find interacting with the virtual process enjoyable and report finding it a very helpful learning aid.

The virtual process is linked to the Statistical Engineering algorithm (Steiner and MacKay, 2005 see <http://www.bisrg.uwaterloo.ca/books/>) for addressing chronic variation problems in manufacturing processes. The virtual process is also well suited to aid in teaching other quality improvement systems such as Six Sigma.

Highlights of teaching with the virtual process:

- Allows quick exploration (i.e. during a short course) of process improvement ideas in a realistic environment without risk or cost.
- Forces participants to think about the details of each process investigation, i.e. when and how many parts to select, what characteristics to measure/change, etc.
- Models the iterative and sequential nature of real problem solving
- Encourages the use of process knowledge gained in earlier investigations to help plan sensible new ones.

The software can be accessed at [www.student.math.uwaterloo.ca/~watfacto/login.htm](http://www.student.math.uwaterloo.ca/~watfacto/login.htm)

Use the default to access the guest account.

For the 5 cause challenge (as described in the rejoinder to my Quality Engineering article “An Overview of the Shainin System for Quality Improvement”) use Login (Student) ID: 5cause & Password (Student Number): 55555555.