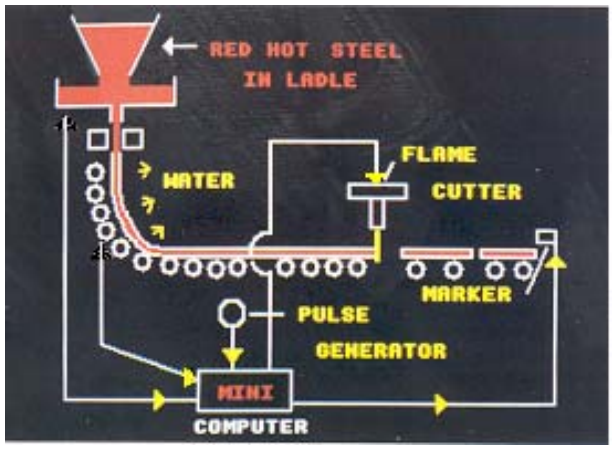
Process control is the automatic monitoring and control of an industrial activity by a computer that is programmed to respond to feedback signals from sensors.

Computers are used in Process Control at Corus in Port Talbot. Corus make steel. We are going to look at Process Control in the ConCast plant which is the Continuous Casting plant.

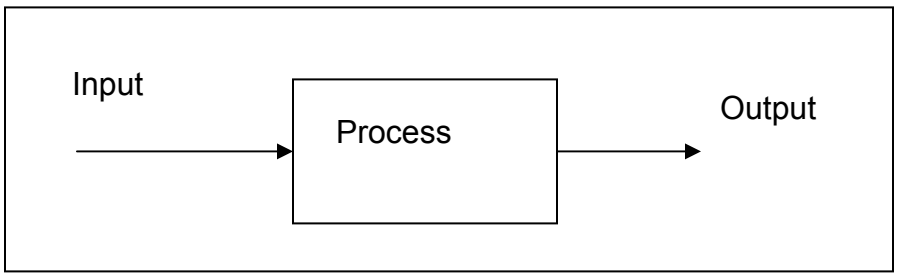
In ConCast the molten steel is poured into a tundish. From the tundish, the steel passes through a mould. The mould makes the steel become rectangular in cross section. It flows out of the mould a bit like toothpaste, except that it is bright red and very, very hot.



The steel is cooled by water next and it turns into slabs. These slabs have to be cut into lengths so that they can be transferred to the rolling mills.

Different customers need different types of steel. The quality of the steel alter depending on the amount of carbon and other elements used. It is very important that each slab has the quality details on it so that Corus know.

In a control situation we always have an input, a process and an output as shown



In ConCast the **inputs** are

- Weight of tundish
- Rate of water cooling
- Rate the steel moves

The **process** is done by the computer. The computer makes decisions as to what the output should be.

The **outputs** are

- The Flame cutter that cuts the slabs into bars
- The Marker which stamps the slabs with numbers that identify its quality.

The inputs are measured by sensors. A **sensor** is a transducer which responds to some physical property such as pressure, rate of flow, humidity. The output from the sensor can be analog or digital. A **transducer** is an electronic component which converts one form of energy to another. For example a thermistor converts a temperature into electrical energy.

Feedback is the use of data from sensors as input to the controlling program.

If the response is automatic and there is no human operator involvement it is a **closed loop.**

If the operator is involved then it is an **open loop** system.

At Concast the process control system is a closed loop system. This is extremely important because the steel is red hot and as we know from the accident in November 2001 it can kill people.

The big advantage of using computers in steel making is that it reduces the risk of danger to the employees.

Possible question:
Give **four** reasons why computers might be chosen to do a task of measurement and control.

- More accurate. They don't go on strike
- Can work continually
- Can be put in dangerous situations
- Can record the measurements for later use
- Repetitive tasks without fatigue
- Can display results graphically

Yes, I know we have given six reasons. ☺