Control Valves

Automatic control systems were primarily developed more than two thousand years ago. The ancient water clock of Ktesibios in Alexandria Egypt dating to the 3rd century B.C. is considered to be the first feedback control device on record. This clock kept time by means of regulating the water level inside a vessel and the water flow from the vessel. A common style, this successful tool was being made in the same fashion in Baghdad when the Mongols captured the city in 1258 A.D.

Different automatic machines throughout history, have been used to be able to complete particular jobs. A popular style utilized during the 17th and 18th centuries in Europe, was the automata. This tool was an example of "open-loop" control, featuring dancing figures which would repeat the same task again and again.

Feedback or "closed-loop" automatic control machines consist of the temperature regulator seen on a furnace. This was actually developed during the year 1620 and accredited to Drebbel. Another example is the centrifugal fly ball governor developed during the year 1788 by James Watt and used for regulating the speed of steam engines.

J.C. Maxwell, who discovered the Maxwell electromagnetic field equations, wrote a paper in the year 1868 "On Governors," which was able to explain the instabilities demonstrated by the fly ball governor. He made use of differential equations to explain the control system. This paper exhibited the importance and helpfulness of mathematical models and methods in relation to understanding complicated phenomena. It also signaled the beginning of systems theory and mathematical control. Previous elements of control theory had appeared before by not as convincingly and as dramatically as in Maxwell's analysis.

New control theories and new developments in mathematical techniques made it possible to more precisely control more dynamic systems as opposed to the initial model fly ball governor. These updated techniques include various developments in optimal control during the 1950s and 1960s, followed by advancement in stochastic, robust, adaptive and optimal control techniques during the 1970s and the 1980s.

New applications and technology of control methodology have helped produce cleaner auto engines, cleaner and more efficient chemical methods and have helped make space travel and communication satellites possible.

At first, control engineering was performed as just a part of mechanical engineering. Control theories were firstly studied with electrical engineering for the reason that electrical circuits can simply be explained with control theory methods. Nowadays, control engineering has emerged as a unique discipline.

The very first control relationships had a current output that was represented with a voltage control input. Because the right technology so as to implement electrical control systems was unavailable at that moment, designers left with the choice of slow responding mechanical systems and less efficient systems. The governor is a really effective mechanical controller that is still normally used by some hydro factories. Eventually, process control systems became available previous to modern power electronics. These process controls systems were usually used in industrial applications and were devised by mechanical engineers using hydraulic and pneumatic control machines, lots of which are still being utilized these days.