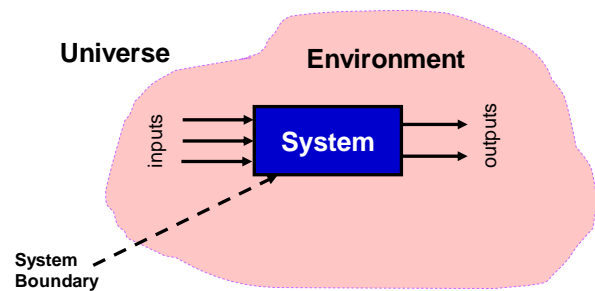# Boundary and Environment

What happens "outside" the system will affect it. In general, what happens outside the system, in the system's environment, is of vital importance. Firstly, the system can affect the environment, and secondly the environment can affect the system. One of the reasons for the failure of many technically brilliant engineering products is due to the lack of attention, by the designers, to the environment. This is not only the environment in terms of the operating conditions but the wider one that includes life cycle aspects, politics, fashion or just human beings.

A key aspect of Systems Thinking therefore is to identify and establish what is inside the system and what is outside in the environment. This requires us to define the system boundary, an interface which separates the system from its environment as shown and detailed below:

- the boundary separates the system of interest from its environment.
- the environment contains those elements and further systems that interact in some way with the system of interest. Typically the environment of a system provides its inputs and consumes its outputs.
- any element or system that does not interact with the system of interest lies outside the environment in the universe.

Deciding what is and what is not part of a system is not easy. Consider the situation given here - what is the system? The purpose of the system is to turn thoughts into marks on paper. The context is the office. Clearly, the pen is part of the system. However, to turn thoughts into marks on paper demands the human and the paper to be part of the system. But, what about the desk? Without the desk, the paper will not be supported at the correct height. Therefore, it is possible to argue the inclusion of the desk as part of the system. If we accept the desk, is it necessary to include the office floor? In which case what about the building, the street, the town - and so on. The choice of what is and what is not the chosen system of interest depends upon the observer and their reason for examining that system. For example if the reason for examining the "turn thoughts into marks on paper" system is to select a pen, then the pen would constitute the system of interest and the human and the paper would be in the environment of that system. If, however, my intent is to design a new pen the system would include the user and the paper and the desk etc., would be in the environment.