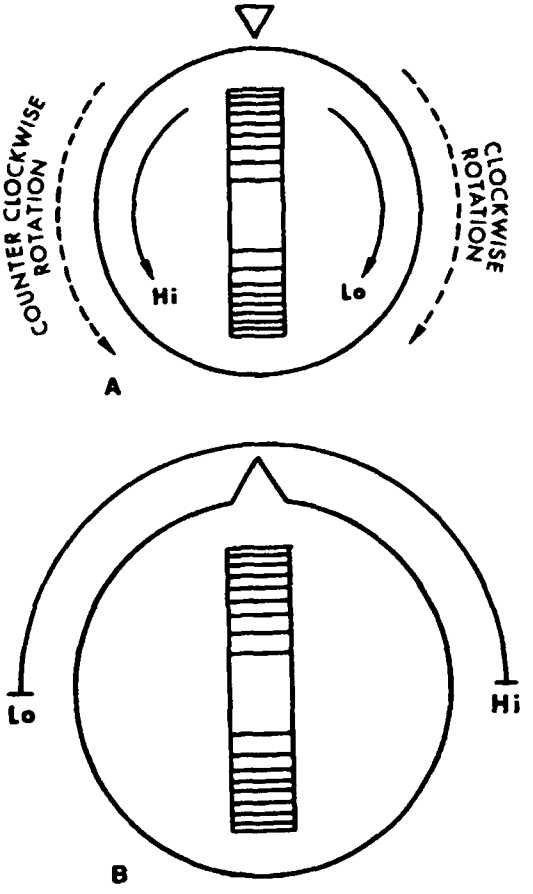


FIG 10–5 —Control B is designed to eliminate errors in the information-processing and machine controlling functions (See also Fig 10–16)

• Communication requirements that conflict with other activities

Often, the man's contribution to a system is to provide a counter-measure in the event of system malfunction or component failure To do this he must know that a failure has occurred and what to do about it

Generally, displays provide the failure information and, therefore, must be designed to communicate such information to the operator The operator must then perform the proper response with the controls provided with a minimum of error—yet it is at this point that breakdowns in the system frequently occur (Displays are discussed later, under "Function 1—Man as Sensor")

Task analysis

Just as equipment can be designed to fit human limitations and capabilities, so, too, can jobs (or tasks) be designed for humans

Human factors engineering research has shown that man needs to be challenged but not overburdened If a job is too easy and too routine it is possible that monotony, boredom, and eventually errors (and accidents) will occur

Machines have a built-in upper tolerance limit If an electrical circuit, for example, is overloaded, the fuse will blow and no harm to the system will result

Man, on the other hand, does not have a "safety fuse box" He can work for short periods under overloaded conditions, e g , high production demands, however, when such an overload reaches some undefinable point, the human may completely break down Such stress overloading may account for the co-worker who suddenly "flies off the handle"

The task of the job designer, then, is to find the happy blend between "easy" and "difficult" jobs With very low levels of psychological stress (boring jobs) performance is also low, as stress increases, however, performance also increases—to a point

The task is to design jobs that will be centered around optimum performance (See Fig 10–6)

Current research in human factors engineering is considering the problem of the distribution of work with respect to the length of the work period For example, the question of distributing the work load over five (short) days or four (long) days requires investigation especially with respect to the type of work involved (See the Yoder and Botzum citation in References for an example of such research)

How to predict task requirements. Human tasks are predicted from the design of the equipment and from the tentative organizational and procedural setup A breakdown of the task requirements can be used for determining training requirements, modification of hardware, and for qualitative and quantitative personnel estimates