

Human Factors Engineering

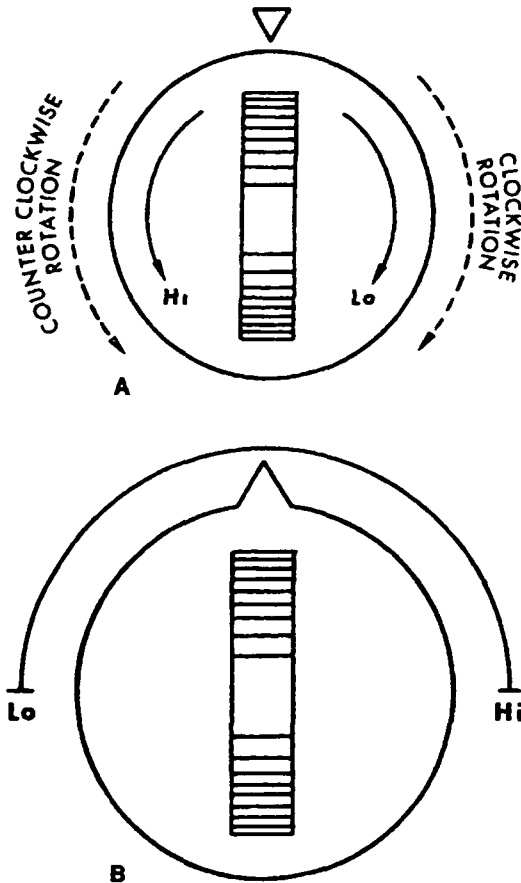


FIG 5-4 – Control B is designed to eliminate errors in the information-processing and machine controlling functions (See Fig 5-13)

- Perceptual requirements near or beyond the physiological limits or that conflict with established perceptual patterns
- Response requirements that are physically difficult, conflict with established patterns, or cannot be readily checked or monitored for adequacy
- Decisions that require undue reliance on short-term memory or must be accomplished within too short a time interval in view of other necessary tasks
- Tasks that overload the human, resulting in imbalanced workload/time distribution, or do not permit adequate or timely monitoring of the system

- 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, too routine, that monotony, boredom, and eventually errors (and accidents) will become prevalent.

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 5-5)

How to predict task requirements Human tasks are predicted from the design of the equipment and from the tentative organiza-