

N391. How To Choose A Manipulator?

Manipulators and robot arms are commercially available in a whole range of types and configurations, for tasks ranging from handling test tubes without breaking them to removing concrete walls by demolishing them. They can be driven manually, hydraulically or electrically. They may have controls as crude as +/- switches for each joint or as sophisticated as a floating joystick giving positional control of the end-effector with bilateral force reflection.

One reason the choice may be restricted from this wide selection may be from the need to work in a radioactive environment; the activity can damage the equipment and the level of contamination that accumulates may restrict maintenance and repair. It is important to remember that one should not choose a unit in isolation, but rather a complete system. Tools will be needed to carry out remote tasks; cameras or windows will be necessary to monitor operations; a machine will be needed to deploy the manipulators at the work site; a controller, with an appropriate operator/machine interface will be required.

Proper maintenance and repair facilities and service supply systems should be another consideration. Remote operations are neither simple nor cheap. It may even turn out that a manipulator is not really needed as a part of the remote system required for a task. Manipulators can be expensive to buy, run and repair and are sometimes very troublesome, so care should be exercised in the selection. Moreover, once a manipulator has been acquired people will utilize it more and more and come to depend on it. Failure can then lead to expensive down time.

In very exceptional circumstances a special purpose manipulator may need to be developed for a particular application. It is advisable not to accept this solution unless there is no other way. Using an "ordinary" manipulator is expensive enough. A special purpose manipulator would increase the cost very sharply. There is a very large number of models available, with much diversity, to choose from.

For more, "Choosing a manipulator", Nuc. Eng. Intl., 1995 Remote Technology Report, p 9.