should be applied to the press brake In addition to the electro/pneumatic clutch and brake controls, there should be gate or barrier guarding at the point of operation (Fig 25-52)

Stroke control

A limited range of strokes is available in standard press brakes Small press brakes may have as little as a one and one-half-inch stroke, large press brakes as much as a six-inch stroke The ram is adjustable to suit the closed height of the dies On press brakes this is accomplished by changing the length of the connections through the use of adjustment screws

Treadle controls To provide the greatest versatility for the large variety of work performed on a general purpose press brake, the basic press brake is equipped with a treadle or pedal Linkage from the pedal connects to the friction clutch and brake of the machine The stopping and holding brake is compression spring set, and the clutch is held released The normal state of the press brake, therefore, is stopped or at rest This places the operator in complete control of the press brake

Depressing the treadle engages the clutch and releases the brake to activate or cycle the ram By varying the pressure and holding time on the treadle, the operator can control the operation of the press brake for many different operations The ram can be moved incrementally, at varying rates of descent, or continuously as desired This permits an operator to "slip" the ram to a partially closed position for some types of gauging It also permits him to reposition his hands at the free end of a sheet that must be held or supported, because the sheet will arc upward when the bending work is performed Using the machine in this manner is quite common, particularly where standard dies are used

A foot-operated machine should always be run by a single operator It should not be operated when other personnel are within reach of the machine working area without the point of operation being guarded

Electro/pneumatic clutch and brake controls In single stroke operations, all controls should be "two hand" palm switches, which must be held down until the dies are closed The palm switches should be spaced so that the operator is required to use both hands When the work requires more than one operator, each operator must have his own station with the switches set so that the press brake cannot be cycled until all switches in the circuit are depressed When a press brake is equipped with multiple stations, the number of stations "locked in" the circuit may have to be changed for different jobs The "locking in or out" of stations should be rigidly key controlled by supervisory personnel, for there should never be more operators than stations

Whenever foot switches are used, provide point of operation protection for the operator The foot switch must be guarded to prevent actuation from falling objects and should not be left unattended by the operator The switch should be turned off, unplugged, and stored when not in use

- INCHING CONTROL, when provided, permits the operator to jog the machine through the cycle and is used only for die setting This form of operation is available through a selector switch in the control panel

- CONTINUOUS OPERATION CONTROL, if provided, is only to be used with automatic feeds, and with barrier guarding of all pinch points, including the point of operation

Speed control Variable speed drive permits selection of a speed suitable to the operation being performed It is often used to eliminate back bending due to the inertia of wide, thin sheets that extend far to the front of the machine Operating a machine at a reduced speed also facilitates handling of the sheet by the operator

Maintenance procedures

Preventive maintenance or electrical and mechanical control components must be performed on a scheduled basis by qualified and trained personnel All press brake components should be given periodic and thorough inspection also to uncover any impending failure or malfunction Any evidence of an unsatisfactory operating condition should be promptly reported and immediately repaired or replaced

Tooling should be thoroughly inspected before use and should also receive periodic supervisory inspection, in order to maintain