DELPHI
Automotive Systems

CEBP9801

BEST PRACTICE

Controls Engineering COE

DATE: May, 1998

RE: Delphi Controls COE Best Practice - Flexible Utility Connections

EXECUTIVE SUMMARY:

The Delphi Automotive Controls Engineering COE has compiled several drawings showing best practice methods to install flexible utilities for lean manufacturing. These drawings are based on the National Electrical Code, NFPA 79 and the experience of several Delphi Automotive plant sites.

ATTACHMENTS:

Best Practice CEBP9801.PPT Flexible Utility Connections

DESCRIPTION:

Drawing 1 illustrates a method of installing 460 volt, 3 phase power drops using standard bus drop hardware. The hardware chosen allows coiling some spare cable above the machine and easily relocating the attachment when the machine is moved to keep the vertical riser plumb. The National Electrical Code does not specify a maximum current for flexible drops. Wire sizes larger than 6 AWG (60 amp drop)are not recommended because of the higher bus drop cable costs and the difficulty in working with the larger cable. Rigid conduit with a flexible section to allow some movement should be considered for 100 amp or larger currents.

Drawing 2 illustrates a method of installing 115/230 volt, 1 phase power drops using standard electrical wireway, plugs and connectors. Each drop is wired back to an individual fuse or circuit breaker connected to a suitable 115/230 volt, 1 phase power source. The wireway is installed above the machines in the shape of the cell.

Drawing 3 illustrates a method of installing 115/230 volt, 1 phase power drops using plug-in busway. The busway is wired to fuses or a circuit breaker connected to a suitable 115/230 volt, 1 phase power source. Each machine is connected to the busway using a fused bus plug. Optional plugs and connectors may be used to connect any or all machines. The busway is installed above the machines in the shape of the cell. This method facilitates the easy relocation of the entire cell.

Drawing 4 illustrates a method of installing a flexible air drop using the same hardware used for installing 460 volt, 3 phase power drops (drawing 1). The hardware chosen allows coiling some spare hose above the machine and easily relocating the attachment when the machine is moved to keep the vertical riser plumb.

Drawing 5 illustrates a method of installing flexible air drops to several machines in a cell. The header is connected to a lockable safety shut-off valve located at floor level. The safety shut-off valve is connected to the nearest factory air supply header. The header is installed above the machines in the shape of the cell. This method facilitates the easy relocation of the entire cell.

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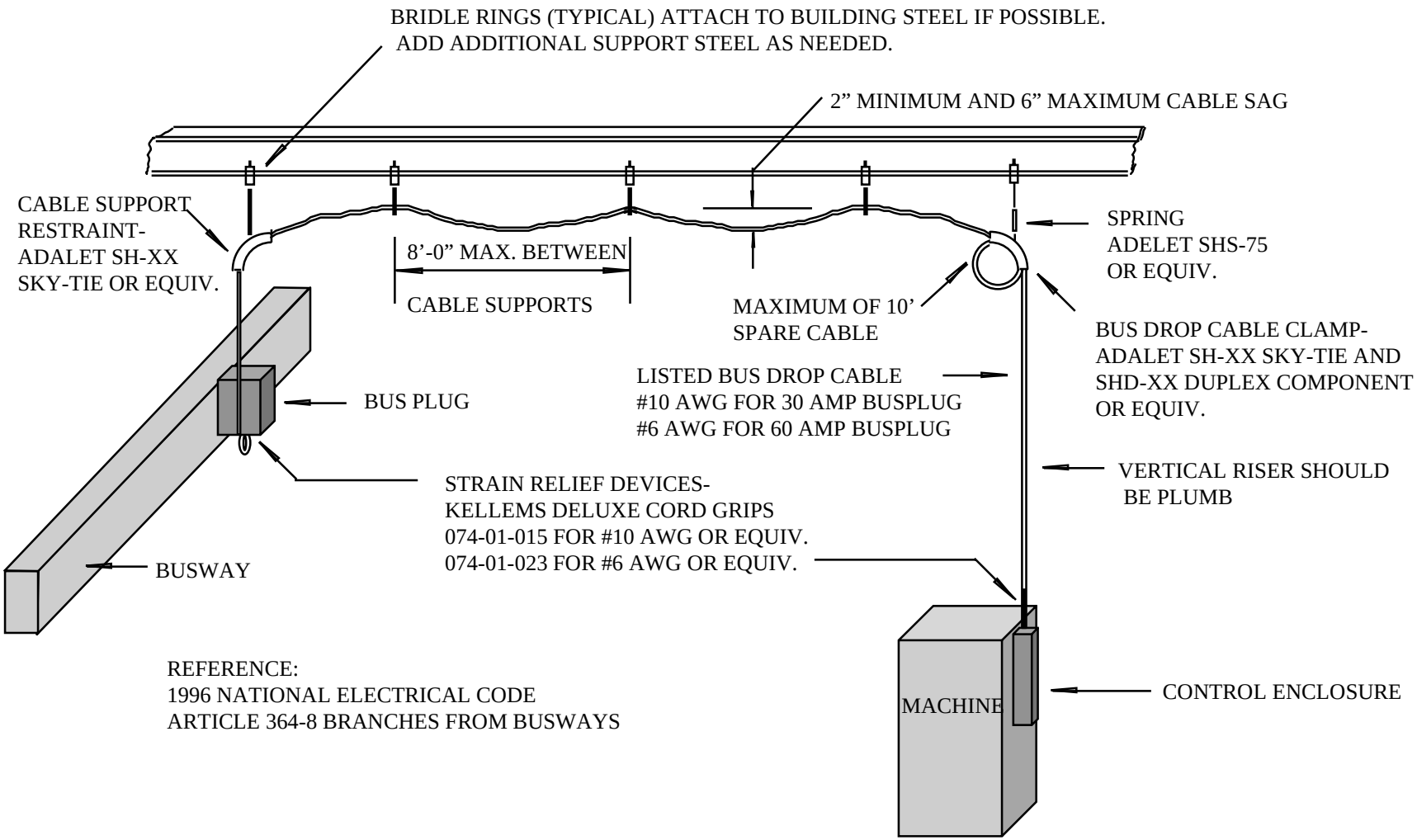
FLEXIBLE POWER DROP
460 VOLTS, 3 PHASE, 60 AMPS MAXIMUM



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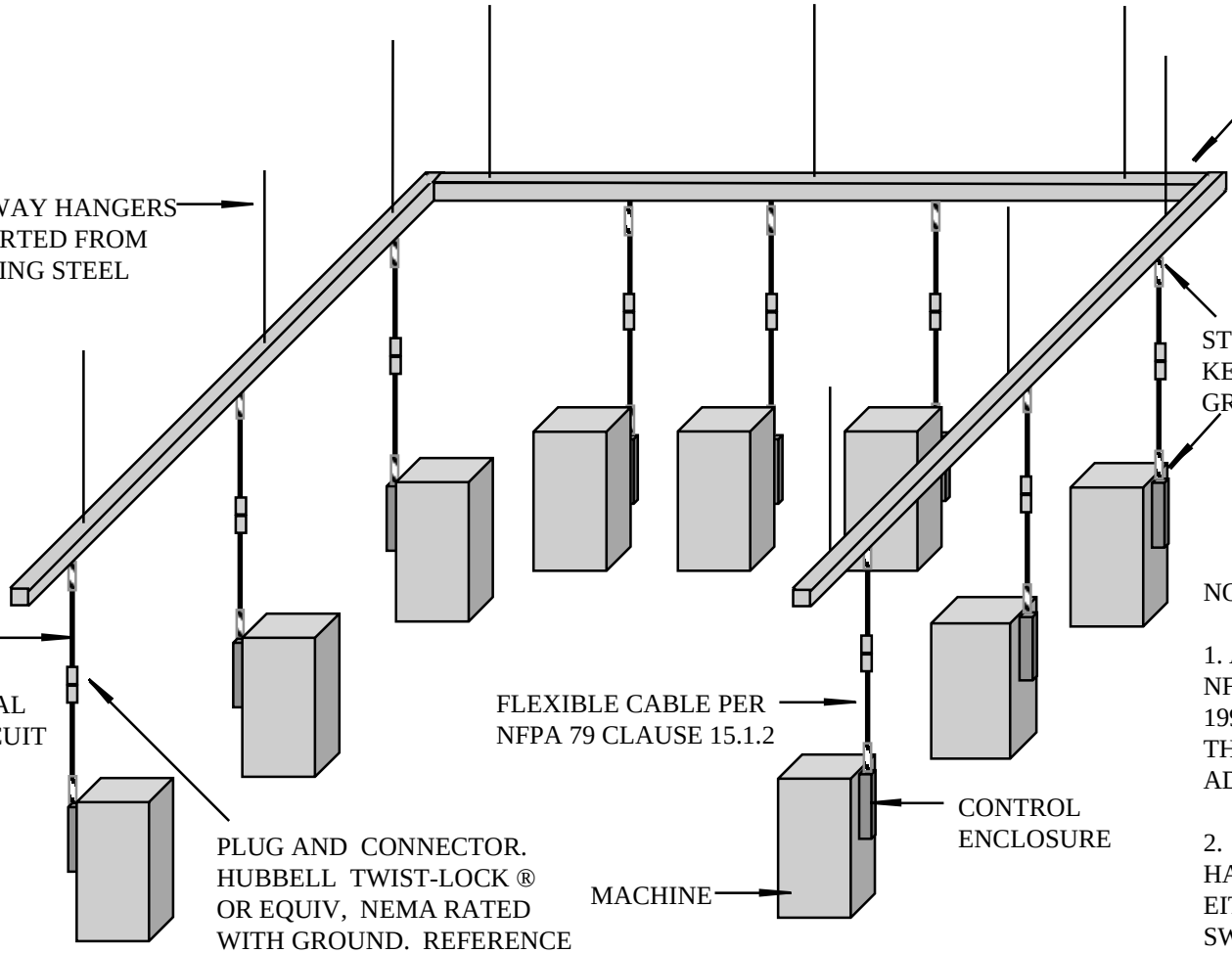
FLEXIBLE POWER DROP
115/230 VOLT, 1 PHASE, 30 AMPS MAXIMUM
WITH WIREWAY



NOTES:

1. ALL REFERENCES TO NFPA 79 ARE FOR THE 1994& 1997 EDITIONS AND THE DELPHI AUTOMOTIVE ADDENDUM TO NFPA 79.

2. EACH MACHINE MUST HAVE A LOCKOUT MEANS, EITHER A LOCKABLE SWITCH OR A LOCKING DEVICE TO GO OVER THE PLUG.

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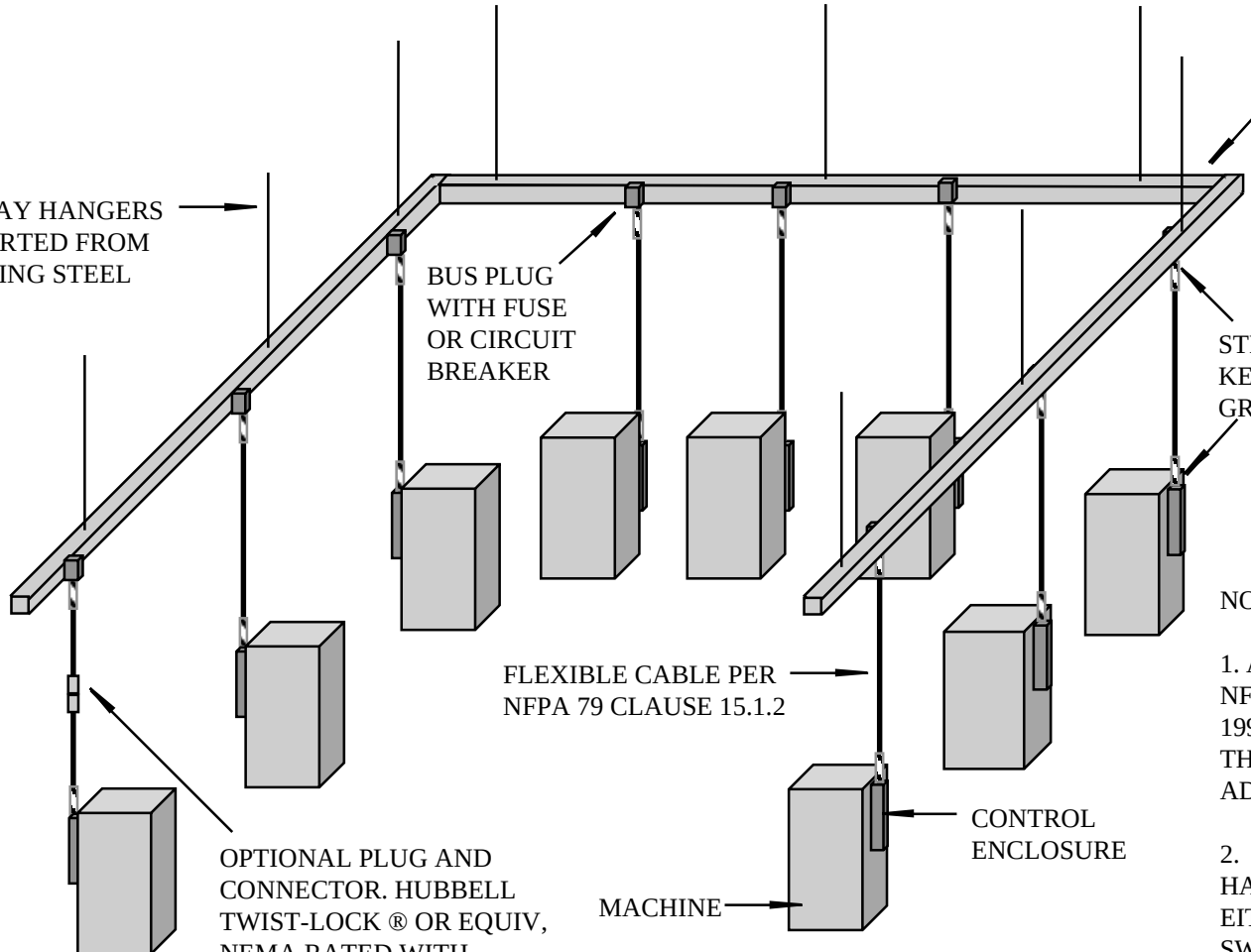
FLEXIBLE POWER DROP
115/230 VOLT, 1 PHASE, 30 AMPS MAXIMUM
WITH PLUG-IN BUSWAY



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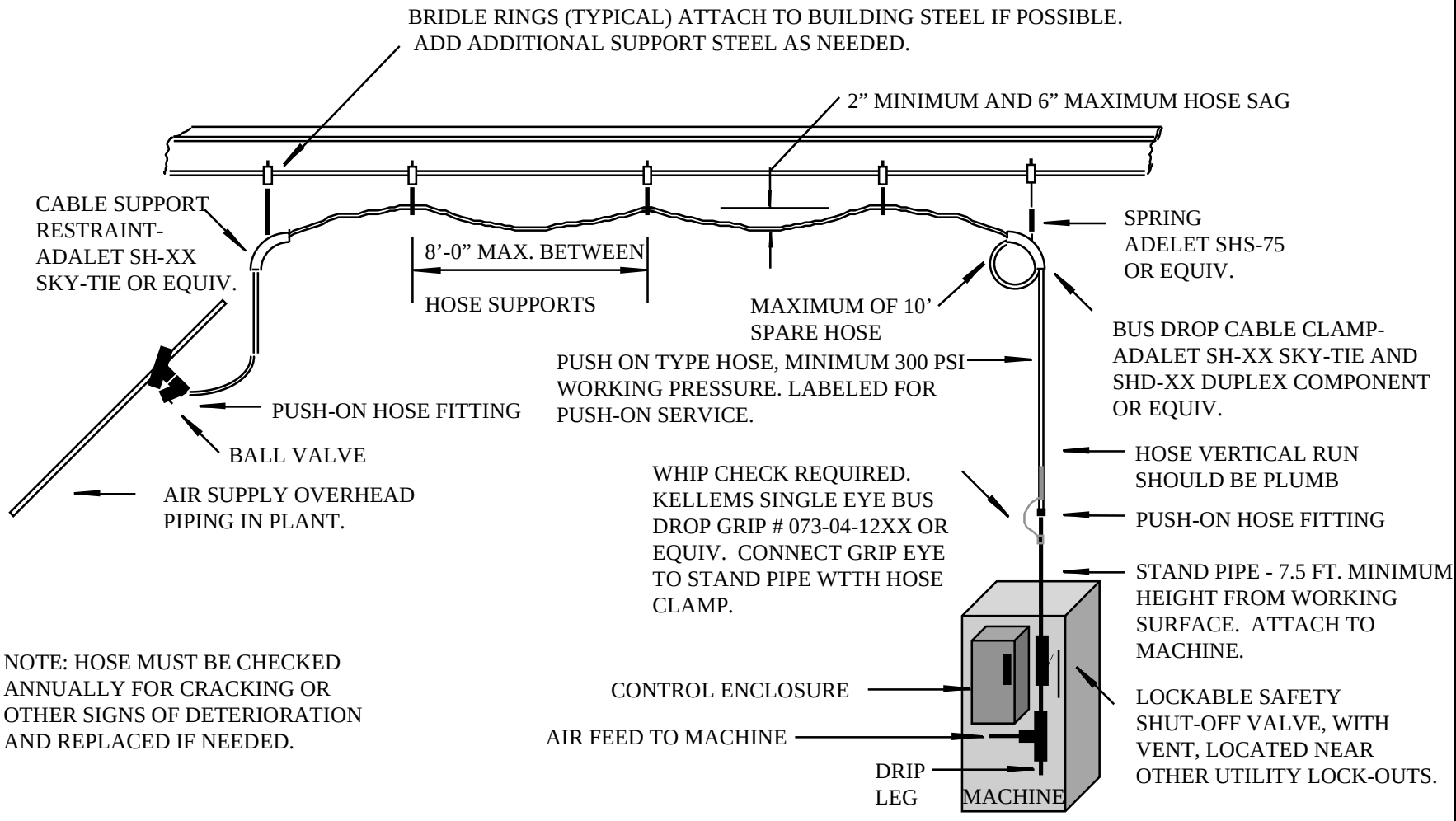
FLEXIBLE AIR DROP



NOTE: HOSE MUST BE CHECKED ANNUALLY FOR CRACKING OR OTHER SIGNS OF DETERIORATION AND REPLACED IF NEEDED.

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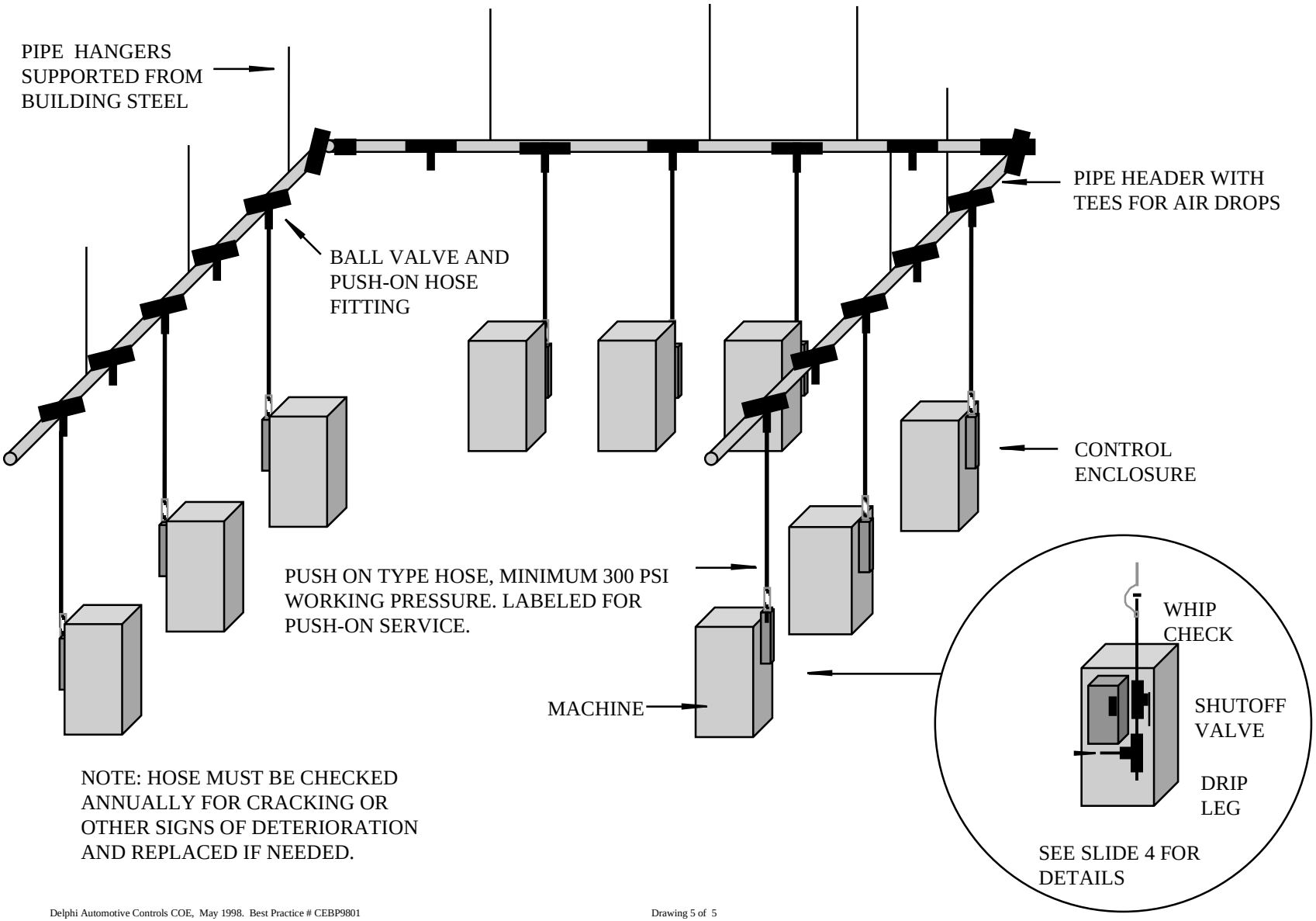
FLEXIBLE AIR DROP WITH HEADER



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