

2.3 Line Dynamics Effect

This example will demonstrate the use of HyPneu to evaluate the influence of hydraulic lines on the dynamic performance of the cylinder control system shown in the schematic. The performance of the cylinder control system when no line influence is taken into account is shown by curves of cylinder velocity and cylinder inlet pressure versus time. The example system was then modified by inserting a 1/4 inch hydraulic line which was 30 feet long (SH9512) between the four-way control and the hydraulic system. The performance of the system with this line is revealed again by curves of cylinder velocity and cylinder inlet pressure versus time. It should be noted that the dynamic response is much slower when the 1/4 inch 30 foot line is included. However, the steady state values for these two parameters is the same.

In addition to the performance curves shown, HyPneu can actually illustrate the pressure wave propagation through the 1/4 inch line. This type of information is critical to precise hydraulic control system design.

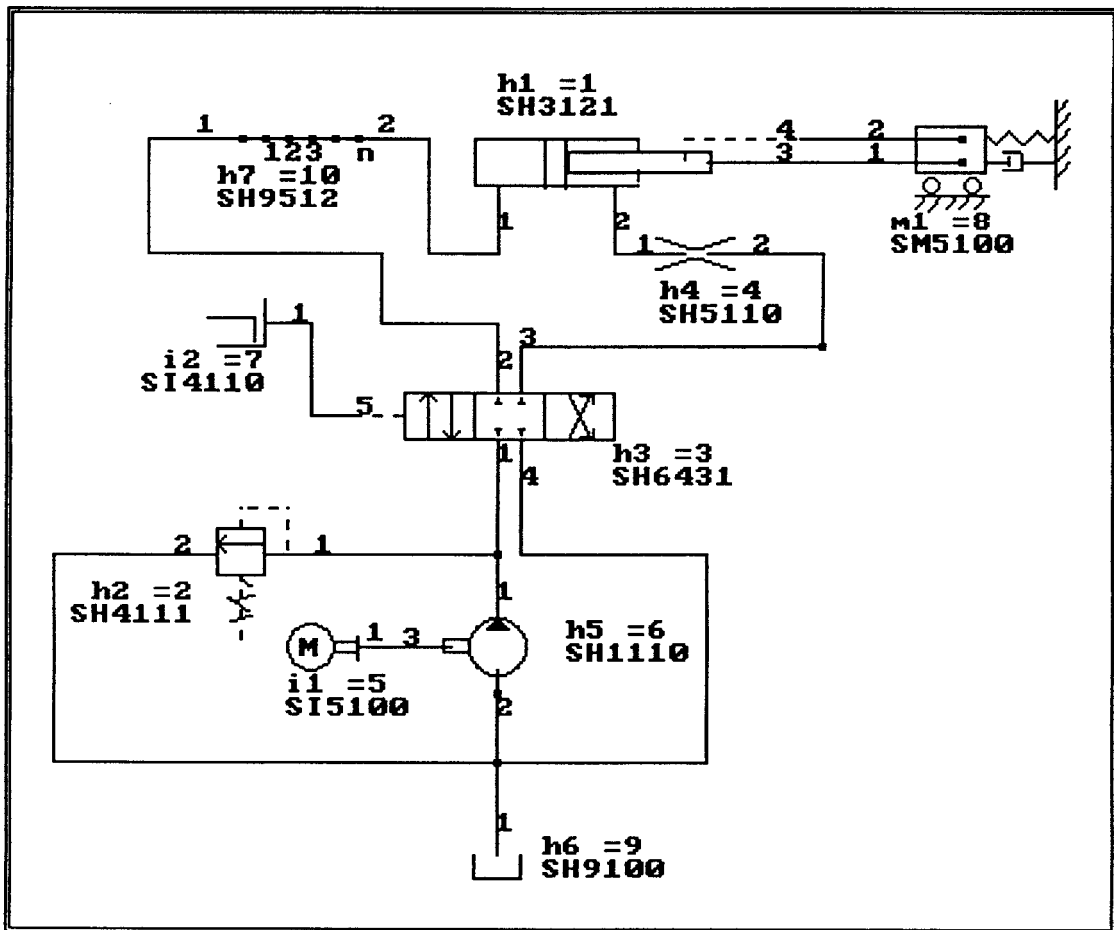


Figure 2.3a. Line Dynamics Schematic

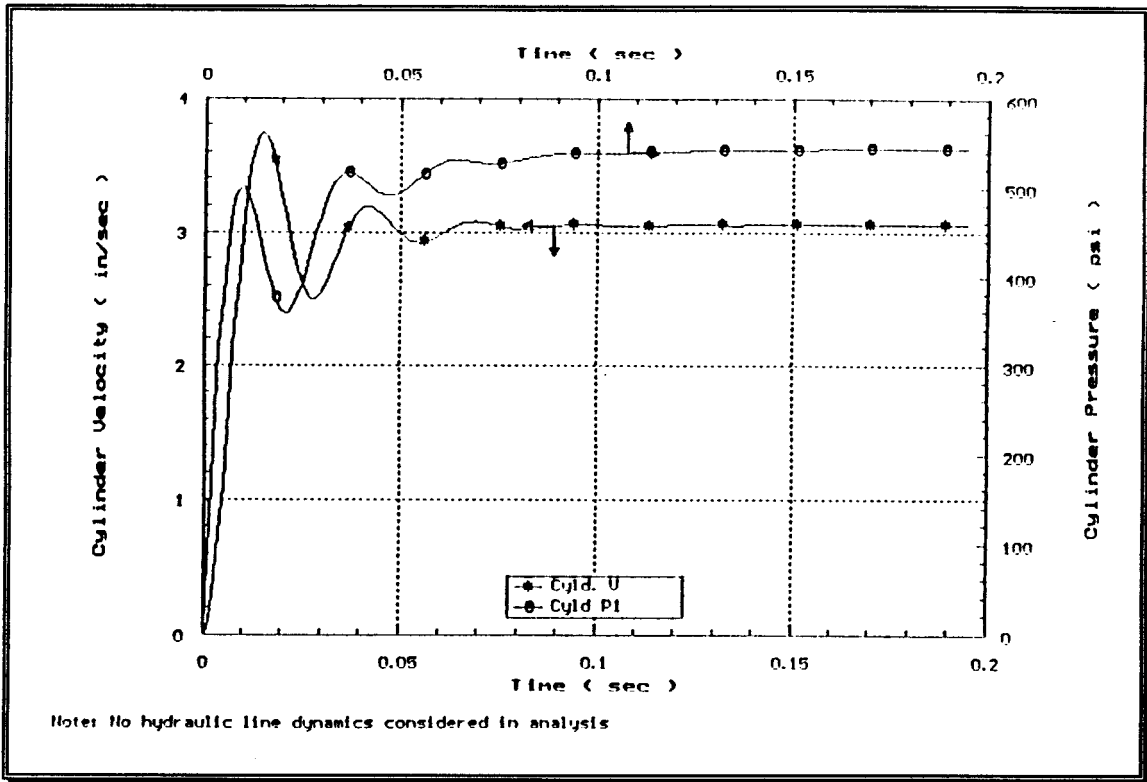


Figure 2.3b. Cylinder Dynamics Analysis with No Line Dynamics Considered.

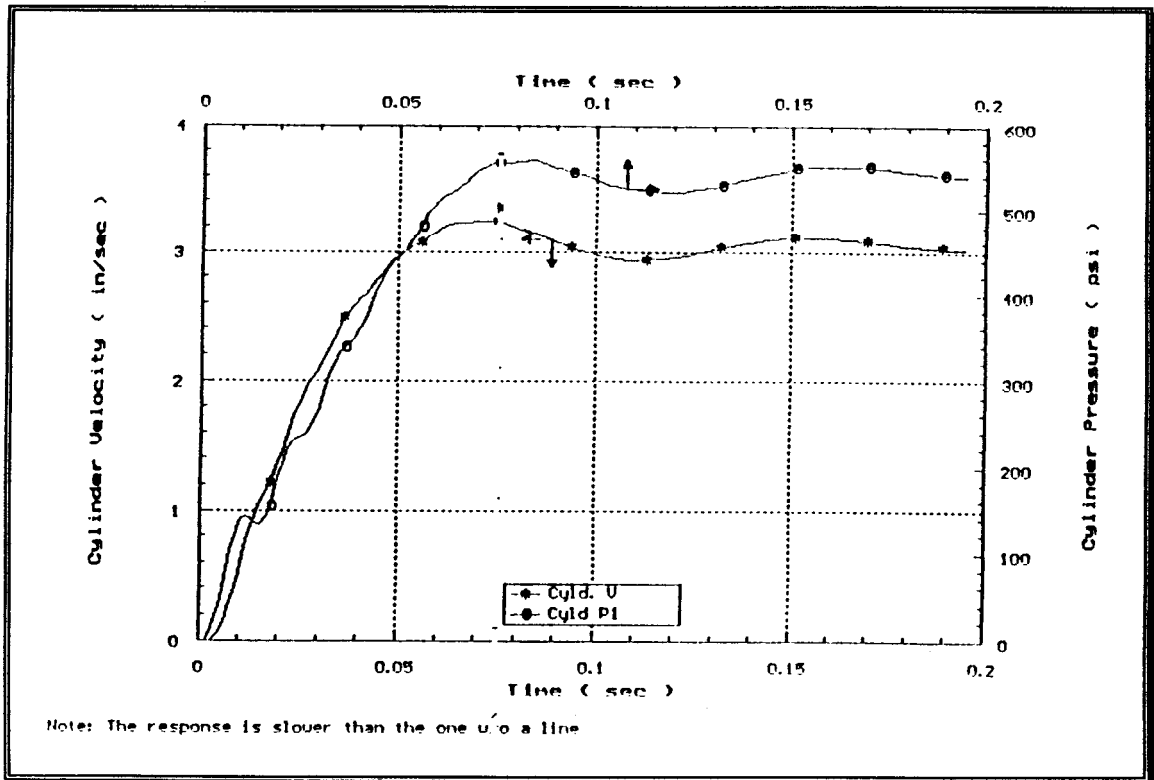


Figure 2.3c. Cylinder Dynamics Analysis with a 30' x 1/4" Line.