

ACPA SAFETY BULLETIN

THE MOST HAZARDOUS STROKE OF THE DAY

Hose-whipping incidents are a well-known and well-documented phenomenon within the concrete pumping industry. The purpose of this article is to shed light on the one aspect of hose whipping which presents the greatest risk of occurrence—Startup.

Any hose-whipping incident requires three things to be present:

1. Air in the delivery system, and
2. Pressure behind the air to compress it, and
3. Concrete to form a blockage in front of the air.

During startup, the entire delivery system is full of air, so the first requirement has been met. You are pushing the primer and the first hopperful of concrete with the force of the engine, so the second requirement for hose whipping (pressure behind the air) is already in place. The last thing needed is for concrete to get in front of the air to form a blockage. This sounds tricky, so let's examine how this can happen.

As you begin to pump, you are introducing concrete into the system so the blockage material now becomes available. As the concrete passes the top-most elbow in the delivery system, loose components such as rock and slurry water will flow downstream ahead of the rest of the concrete by the force of gravity. (See Figure 1.)

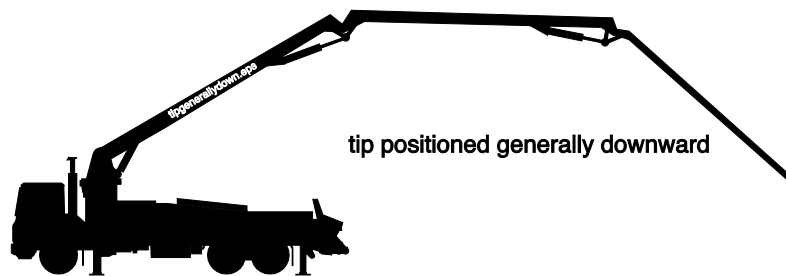


Figure 1, Position of Boom at Startup

The first fin or two of material that comes out of the ready mix truck is typically 'bony' (rocks without the other concrete components in correct proportions) and not homogeneous like the rest of the load will be. Furthermore, the pipes are dry, having not been primed yet. Summarizing what's happening in the pipes:

1. Bony, un-homogeneous mix enter the pipes before the rest of the concrete
2. The pipes are dry and not primed

3. Certain loose components have gotten in front of the rest of the mix by the force of gravity
4. Air is between the loose components and rest of the mix
5. The rest of the mix is moving without trouble in the now-primed pipeline. Compressing the air in front of it would be a natural by-product if a blockage formed in front of the air.

The combination of those conditions makes a hose-whipping incident more likely. If the boom is connected to several lay-down hoses, the situation becomes even more hazardous, because of the increased friction of rubber. The loose components will form a blockage in rubber a higher percentage of the time than in steel. (See Figure 2).

The point is this: It's imperative to keep people away from the end hose(s) whenever air may be present in the system, but it's never more likely than in the first one-half yard of the day. Once homogeneous concrete is emerging from the hose, the hazard is gone and the pour can commence.

It's important to remember that your placing crew may not have received safety training. If an unsuspecting laborer attempts to get near the point of discharge during priming, stop the pump and remove them from harm's way until the hazard is past.

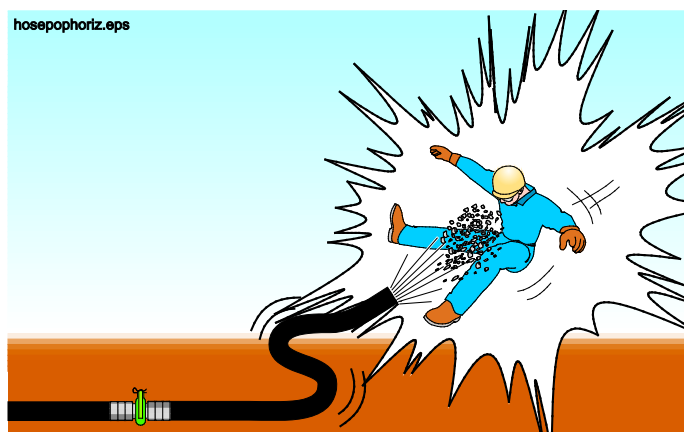


Figure 2. Rubber hose increases odds of a blockage

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