

# Linde Focuses on Acetylene Safety



John Romer, Head of Cylinder Process Safety and Standards

*Linde Gases, a division of The Linde Group, announced the launch of its worldwide safety program to improve the safe storage and transportation of acetylene cylinders by customers. Gases & Instrumentation had the opportunity to speak with John Romer, Head of Cylinder Process Safety and Standards at Linde about this program.*

**Gases & Instrumentation:** What is the general focus of this program?

**John Romer:** The focus of this program is very much on the collection of acetylene cylinders by our customers from our depots and then transporting them to the place where they are going to be used.

**G&I:** But you also deliver the cylinders to customers, correct?

**JR:** Yes. Our preference of course is that the customers order their cylinders from us and we deliver them. But we recognize that a substantial proportion of customers collect the cylinders themselves.

**G&I:** This gives you less control.

**JR:** Yes, because some customers collect the cylinders in unsuitable vehicles; often closed vehicles, and secondly they don't restrain them sufficiently inside the vehicles; thirdly, often they leave the cylinders sitting in their vehicles overnight. And as a result of this we find that there are a number of incidents every year in which the customers get either badly burned or even killed outright by explosions from the back of these vehicles. What we want to do is to cut that level of injury down and of course with the goal of trying to get down to zero injuries.

**G&I:** So it is what you can do from your end and how you can inform the customer.

**JR:** There are some things that we can do ourselves and I'll discuss these in a minute. But the other aspect is educating customers as well. They need to know that it is in their hands to behave more appropriately and treat the cylinders in a way that is going to keep them safe. We want to make sure that they understand how best to do that.

**G&I:** I imagine you have examined these incidents in planning this program.

**JR:** We looked at the history of incidents with Linde companies around the world as well as other companies having incidents that were reported in the news media. We found that they basically broke down into two types. In one type, customers were transporting cylinders around in the back of their vehicles maybe in an enclosed pickup truck or a panel van. In these incidents, the cylinders were not properly restrained. The cylinder valve was able to be knocked open by bumping into something else in the back of the vehicle.

**G&I:** A cylinder leaking acetylene in an enclosed space is a recipe for disaster.

**JR:** This is a dangerous situation. Often as not, the customer would hear that this was happening, would stop the vehicle, go to the back of the truck to have a look. Of course there was a flammable atmosphere in the back of the vehicle. So when they opened the back of the vehicle it would ignite, maybe just from a tiny spark from the metal door rubbing on the side of the vehicle, and the customer would receive burns. Sometimes if they were lucky, superficial burns. Sometimes if they were unlucky, quite severe burns.

**G&I:** What about leaving the cylinders in the vehicle overnight?

**JR:** Yes, cylinders left enclosed in a vehicle overnight cause the second type of incident. Take a typical example. Suppose someone is, say, a refrigeration engineer. He has cylinders in the trunk of his car or van. They may be hooked up to other welding equipment. He parks the vehicle in front of his house, and goes to bed. During the night, there is a leak from one of the valves. The next morning when he comes to open up the vehicle as soon as he unlocks it, or starts the engine, a large explosion occurs.

**G&I:** So do you see a pattern?

**JR:** Definitely. We always find this type of incidents happening in the morning. Because the customer left them overnight and this is the first time he comes to the vehicle. Acetylene doesn't need very much oxygen to ignite. It is flammable over quite a wide range. So maybe when you open the door or even just press the remote button on the key fob, you have a little spark in the vehicle that can be enough to cause the explosion. We had an incident in Australia in 2011 where the customer was opening his van which had been parked overnight when it exploded and killed him. So we have two different types of incidents and they need a slightly different approach to deal with.

**G&I:** How are you approaching these two problems?

**JR:** With the type of incident where the customer collects the cylinders from us and drives away with the cylinders rattling in the back, we are doing a couple

of things. Firstly, we are making sure that all our staff are trained to understand the problem and know what they need to do to try to keep the customer safe, and to communicate with the customer about this problem. Secondly, we are producing plastic caps that we insert over top of the cylinder that prevents the valve handwheel from accidentally being knocked open. If the customer turns up with an unsuitable vehicle without the ability to restrain the cylinder properly, we will fit these plastic caps to the cylinder to protect the valve from accidentally being turned on.

**G&I:** So part of the answer is an engineering solution?

**JR:** Yes, and the other part is the conversation between our customer service assistant and the customer. When the customer turns up at our depot we need someone to explain to them that their vehicle may not be suitable for transporting cylinders, and what the risk to them is. And to support that, we are also producing communications material, things like posters and leaflets, so we can back up the information from our staff.

**G&I:** Most of the cylinders I see in the US seem to have a metal cap over the valve. It is not standard to place caps on cylinders?

**JR:** Unfortunately, the standards in different countries do vary a great deal. In the US, cylinders are supposed to be fitted with the metal caps. That is true in some other countries as well. But in some countries, the design of the valve is very vulnerable to being knocked open by accident. So it varies a great deal around the world. But one of the problems is that the metal caps are not always fitted to the cylinders. And in some countries customers don't always bring back the metal caps from their old cylinder, so they take away a cylinder without the metal cap. The plastic cap means that even if the metal valve cap is missing we have a quick, easy way to provide protection.

**G&I:** Will you have to make different caps for different countries based on cylinder design?

**JR:** That's a very good question. In fact



we have been very lucky and nearly all of the valves that we have around the world are covered by the one cap design. We have only found a few valve types in Australia which our standard cap won't fit. And the Australians are producing a special solution for that situation. Pretty much everywhere else the standard cap fits.

**G&I:** This solves the problem of the cylinders being picked up at the service center, but not the overnight problem.

**JR:** This problem is entirely about education. Unfortunately we cannot directly control what the customers do. All we can do is to take reasonable steps to make sure that they understand the risk and they understand what they can do to make themselves safe. Part of this campaign is about providing education to customers at our point-of-sale about the risks of leaving the acetylene cylinders in their vehicle overnight, especially if they have other gas equipment connected. For mobile users we recommend using a well ventilated vehicle. Where the customer has a typical enclosed vehicle we strongly recommend making sure the cylinder is isolated at the cylinder valve, any hoses are disconnected from the cylinder, the cylinder is properly restrained, and taking the cylinders out of the vehicle when arriving at the destination or when parked up at night.

**G&I:** John, thanks for taking the time to tell us about this important safety initiative.