ORGANIC finishing

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Safety Standards for Spray Booths

When I was first asked to write an article on "Safety Standards for Spray Booths," I thought it was because someone had seen the presentations at the coatings shows and thought they had discovered a cure for insomnia. I checked with the American Medical Association and was informed that boring articles had been putting people to sleep since the written word originated.

If you have experienced a factory fire, or any disastrous fire, you might not find this so boring but slightly informative.

The goal of this article is not to go down the list of requirements in the standards. If you are involved in the finishing industry, you should be informed of the correct standards. These should not be seen as a restriction on your ability to produce, or a way to take your hard-earned profits for some arbitrary rules.

These standards have been written in response to events that have happened, and to prevent other similar events that we know could occur. As you know, standards are subject to interpretation. Also remember that the local authority having jurisdiction may require further prevention methods. You need to know these codes to understand these interpretations, and to argue your points, if necessary.

Safety is paramount to human involvement in any dangerous activity. In the finishing industry, we deal with areas in factories that spray flammable coatings and produce explosive environments. These are atomized liquids or solvents, high concentrations of powders, or dusts. Should a source of ignition be introduced to this atmosphere, the potential for fire is very high.

The governing safety codes and standards are the the International Fire Code (IFC) and NFPA 33 Standard for Spray Application Using Flammable or Combustible Materials. These documents refer to other codes and standards such as the International Building Code (IBC), NFPA 101 Life Safety Code and the National Electric Code (NEC). In this article we will review information that is in NFPA 33.

To help users understand the reasons for the standard, NFPA 33 contains annex material (see NFPA 33 Annex D Fire Record).

Following are direct quotes from this section:

Leading Causes of Fire in Conventional Systems (Air Spray, HVLP, Airless,...)

1. Use of a spark-producing equipment such as cutting, welding, and grinding near the spray area.
2. Friction in most cases by overheated bearings on the exhaust fan or by rubbing of exhaust fan blades against the overspray deposits on the wall of the duct.
3. Arcing electrical equipment
4. Spontaneous combustion
5. Discharge of static electricity

Leading Cause of Fires in Electrostatic Spray Operations

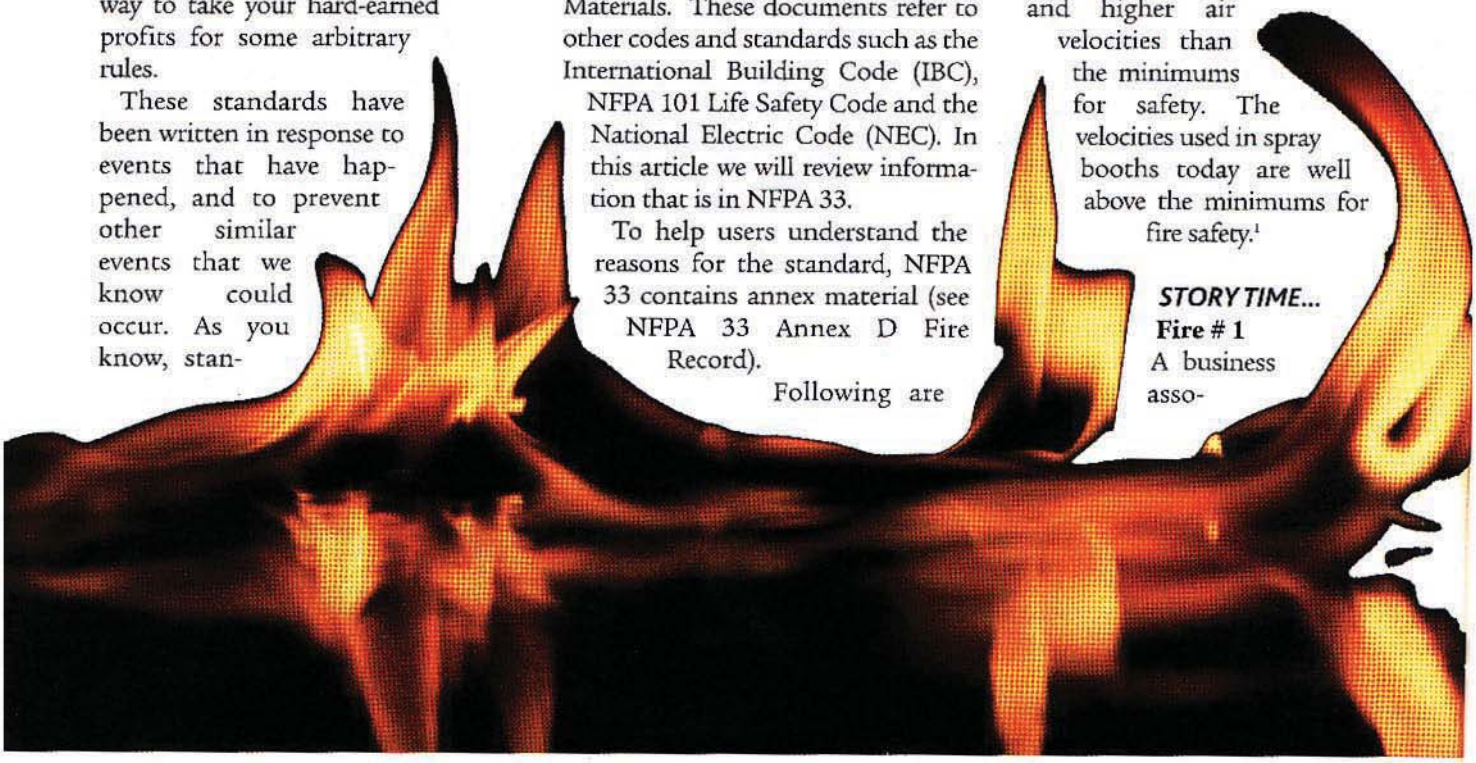
1. Ungrounded or improperly grounded objects in the spray area
2. Failure to fully discharge equipment before cleaning
3. Pinholes leaks in the paint tubing to the spray gun
4. Other causes similar to conventional systems, such as smoking and cutting and welding

The two lists above are certainly good places to start. The NFPA and OSHA are concerned about safety; you and I need to be concerned also. The quality of the final finish, however, is not their concern. A good finish requires a clean area and higher air velocities than the minimums for safety. The velocities used in spray booths today are well above the minimums for fire safety.[1]

STORY TIME...

Fire # 1

A business asso-



ciate was fixing a booth that had only been test sprayed in, but not production painting. The fire watch guy showed up with water buckets and fire extinguishers.

"Yeah, Yeah great! Just stand over there. No big deal." Ten minutes later they had used everything available to put out the fire, plus running to get more. Things were scorched. But all was OK. It was interesting to hear his story because he was waving his arms and very excited. He didn't have fun that day, and today, he looks at fire safety differently.

Fire # 2

There is so much overspray inside the duct as to start and support a fire. Come on. We shouldn't even have to talk about this one. Change your filters, clean your system. This one comes up all the time, came up during the writing of the article. It was cheaper to replace fan and duct than to clean it. You can't use explosives to clean the duct; remember #1: explosions produce sparks.

Fire # 3

A painter smoking a cigarette and flushing solvent, from an electrostatic gun in to an ungrounded trash container. Boom! Painter only lost the hair on his arm and only almost set the building on fire. The flames reached to the truss at 40 ft. in the air.

Today I can only hope he is not texting, smoking, flushing solvent, etc... You know, texting will get you in trouble these days.

[I was asked by *Metal Finishing's* organic coatings editor to clarify this one, as I was trying to keep this entertaining I left out some details and standards.] First, you don't flush solvent into the trash container (even if it was grounded, this was funny), yes even though the paper, cardboard, and wood help soak up the solvents. Yes, that's what they told me that day.

Reality, By the Standard-Flush only into the proper containers for disposing of solvents and keep all items properly grounded. (The other funny part was texting will get you in trouble. What the funny part was, was texting is nothing compared to burning down the factory. Oh well, let's move on.)

Fire # 4

The next painter involved with solvent, spray guns, and cleaning technique *did* burn down the factory. The gun was covered in solvent, flushed and atomized into the booth, and to top it off, with the power on. That's #2 in Electrostatic Systems causes. Nothing funny here, it took eight years for this one to work its way through the court system. The electrostatic paint gun manufacturer was found not guilty. No one was hurt, but millions of dollars were lost.

Fire # 5

And last but not least...The installer of the new sprinkler system dropped a hot bit of metal from the drill bit into the lacquer dust in the dirty, dirty booth. What an exciting day. Those Firemen really earn their money, and our respect. They were good, too. They could not save the finishing shop, but they saved the rest of the building.

Those fire trucks have a nice paint job! They are our customer. Very safety conscious. This fire could have been avoided by keeping the area clean or by at least cleaning before work started. I stress these. Lets do the math. Flammable materials in the air (explosive) + dirty build-up (fuel and impairment to fire extinguishers) + a spark (source if ignition) = Fire.

The above stories are true. No one was hurt. That is the only reason we can chuckle a little. But two of those losses were over $1 million each.

Powder coating is typically a safer operation. (Please read below.)

NFPA 33 D.1.3
Powder Coating

- **Loss experience indicates that where provisions of this standard were followed the typical fire of a powder system was confined to the powder spray pattern of the guns when the powder supplies shut off, burning stops**
- **Losses resulting in greater damage have occurred when the powder supply was not immediately shut off**

Guess what happens when you don't do these things. Covering up the UV Spark detector isn't really a good idea.

I am going to keep you in suspense. Read NFPA D.1.3.1 and D.1.3.2. These sections have the words; Ignition, Fireball, Burning, and Substantial Damage.

So understand safety, the correct standards, and the correct procedures, too. Understand the reasons why these fires occur.

As stated earlier, standards are subject to interpretation. Also remember that the local authority having jurisdiction may require further prevention methods. How strict they are may depend on your past safety record—and your safety record will also impact your insurance costs.

Visit the websites for the International Code Council (www.iccsafe.org) and the National Fire Protection Association (www.nfpa.org) for more information and access to the standards and codes. Follow the safety list on the equipment you have purchased, train your personnel properly, and don't let down your guard. Safe finishing!

REFERENCES

1. A good review of this was provided in *Metal Finishing*, February 2010, pp 38-39.

BIO

Marty Powell is territory manager for Global Finishing Solutions, Carrollton, Texas. A 28-year veteran of the industry, Powell has extensive knowledge of spray booth design, finishing systems, and air-handling systems. He earned a Bachelors Degree in Business Administration, with a minor in International Management, as well as a Bachelors Degree in Marketing from Northwood University, Midland, Mich. Powell has also held positions in organizations such as the Chemical Coaters Association International, The Powder Coating Institute, and the Society of Manufacturing Engineers.