SAFETY / OSHA
UPDATE

A Newsletter from High Safety Consulting Services, Ltd. | Information on Safety & Health in Your Workplace

HIGH SAFETY CONSULTING SERVICES, LTD.

SAFETY / OSHA UPDATE - LUCK O' IRISH ISSUE

LUCKY?

"Wow! He was lucky!" We've all heard this and perhaps said it ourselves. But really, what is luck? I thought it might be interesting to address luck from a scientific perspective. Of course, not everyone enjoys these types of discussions, but chances are – if you're in the safety field, you just might enjoy this! --- Luck is another way to say that statistically the outcome of a particular exposure was lower than the average expected outcome. That is to say that on an individual basis we can be "lucky". In whole, the statistical sample regarding an exposure outcome to a specific hazard takes a chi-square curve (or is predictable with no luck involved). The average exposure in the curve (under the peak) is the most likely type of injury to occur.

That is to say that the average injury in a slip and fall might be a superficial abrasion, while the average injury in a parachute failure is likely death. If we die as a result of a slip and fall (like Dr. Atkins) we are clearly 'unlucky'. If we survive a parachute failure, we are clearly 'lucky'. So the resulting severity can determine our perception of good or bad luck. We probably don't recognize that a slip and fall resulting in no injury as being "lucky" because it is close to the average injury of a superficial abrasion.

If our specific injury falls to the left of the peak of the chi-squared curve, we can say we were "lucky." If we fall to the right of this peak, we are "unlucky." The further to the right, the more "unlucky" we are and the further to the left, the more "lucky" we are. The distribution of outcomes (injuries) for a specific exposure event can be determined with enough data points.

The other component of luck perhaps can be related to the probability of the event occurring in the first place rather than the probability of the outcome of the event. So we can not only predict the probability of an event's outcome, but we can also predict the probability of the event occurring in the first place.

A parachute jumper has a 1 in 100,000 chance of his parachute not properly deploying. So if it does not deploy, he is unlucky (as it was much more likely to open). If he does not survive the fall, this is expected and not lucky nor unlucky – he was unlucky because it did not deploy in the first place. If he does survive, he was unlucky because his chute did not open, but lucky that he survived.

If I intentionally reach into the trip pad of a rat trap and the unit actuates on my hand, we might have a hard time saying that this was "unlucky," because the probability of the trap actuating on my hand is nearly 100% or 1 in 1. It was foreseeable that this would be the outcome. If I die as a result of the injury I receive to my hand we would now say I was unlucky because the outcome was worse than the expected average outcome of perhaps soft tissue bruising.

It turns out that luck consists of these two statically definable aspects: a) Probability of the Event Occurring and b) The Distribution Probability of the Outcomes. To date there have been no validated studies that I am aware of which confirm or deny that rabbits' feet or four leaf clovers can change injury probability or outcomes. We do know

that effective safety and health procedures and controls CAN improve both the probability and outcomes --- So give your workplace a good dose of LUCK – BE SAFE!

CHEMICAL EXPOSURE EVALUATIONS

When evaluating chemical exposures, a good place to start is to review the chemical usage within the facility. Which materials are being used regularly and how are they being used? Are employees complaining of any specific process or chemical? Next a review of the Material Safety Data Sheets (MSDSs) for the most commonly used products should be performed. Finally, a review of all other chemical sheets should be done to identify any high-hazard chemicals which may only be used intermittently or which might not have good warning properties.

Often individuals associate an odor with chemical exposure. While an odor tells us something is present and may even be objectionable, it does not have any relationship to hazard. Some chemicals possess no odor and can be deadly, while other stink to high heaven but do not create a health hazard. Odor thresholds can be determined by assessing the chemical's characteristics. Sometimes this information can be found on a MSDS. If the odor threshold is below the threshold limit value (TLV), and there is no odor in the air, we can determine that there is likely no over-exposure. If an odor threshold is above the TLV for the chemical and the chemical can be detected by smell -- we can assume an over-exposure exists. So…odor can be helpful in determining hazard only if the odor threshold is known in relation to the occupational exposure limits. If the chemical also has the ability to enter the body by contact, odor alone should not be used to determine exposures.

The following aspects of chemical exposure should be considered: 1) How likely is the chemical to be present in the air? This is affected by the state of the chemical. Gases and vapors are molecular in size and will be less likely to settle out, where as dusts and fibers tend to be larger. Fumes (from welding operations) are smaller than most dusts but larger than a gas molecule. The smaller the contaminant, the more likely it will remain air borne and the more likely it will enter the deep lung. Consider the vapor pressure of the solvent. The higher the vapor pressure, the faster the product will evaporate into the atmosphere. This should be compared to atmospheric pressure (1 atm = 14.7 psi = 760 mmHg = 29.92" of water = 760 torr). How the product is used will also affect the exposure levels. If a coating is sprayed on vs. applied by brush, the mist will be distributed throughout the air and each mist droplet will have more opportunity to evaporate into a vapor from being propelled through the air. 2) How toxic are the contaminants. A solvent with a TLV of 1000 ppm may be of limited concern when brushed, but a greater concern when sprayed. A solvent with a TLV of 1 ppm may be of greater concern when brushed. 3) What are the percentages of the ingredients? A 0.5% content of most chemicals would raise little concern. However, certain chemicals with very low exposure limits might still be worth evaluating at low concentrations.

In order to provide some magnitude of hazard compare TLV's of some various products. Dusts are usually measured in milligrams per cubit meter (mg/m3) while gasses and vapors are measured in parts per million (ppm). One of the lowest established TLV's for a dust is Strontium Chromate set at 0.0005 mg/m3 and for a vapor TEPP is set at 0.004 ppm. By comparison, stoddard solvent (a common solvent) has a TLV of 100 ppm and nuisance dusts are set at 15 mg/m3. It is important for companies to assess the exposure to which employees are exposed for both short-term and long-term heath hazards. OSHA requires that employees are not exposed above the established PEL's outlined in the standards. Many of these standards however were created in 1970 and do not reflect the current state of science. That is way everyone should be looking at the TLV and NOT the PEL!

AED CLARIFICATION

In the last issue, I mentioned that there are some AED units on the market that shock at the same maximum energy level of 150 J. While the lowest effective energy level should be used for defibrillation, limiting peak energy potential may deprive some victims of a needed higher-energy shock. None-the-less, these units are approved by the American Heart Association.

UPCOMING TRAINING PROGRAMS presented by HSCSL:

See our training page for more details on the following programs: http://www.highsafety.com/hsl/resources/courses/

Safety Committee Certification Class (April 23, 2004) Half-day course. Meets PENNSAFE requirements for certified safety committee member annual training.

OSHA 10-Hour Construction Course (May 12-13, 2004) Two-day, OSHA-authorized course. This program will be offered through Associated Builders & Contractors (ABC) Keystone Chapter. Call them at (717) 653-8106 or visit their website www.abckeystone.org to register.

Understanding and Managing Mold Contamination (July 9, 2004) Half-day course. Presents health effects and techniques to handle mold contamination.

Practical "Hands On" Industrial Hygiene (August 23-25, 2004) Three-day course. Allows participants practice sampling for noise, dust and vapors. Students will also practice interpreting laboratory results and calculating 8-hour TWAs.

OSHA 10-Hour General Industry Course (September 13-14, 2004) Two-day, OSHA-authorized course. 2.0 ABIH CM points.

OSHA Instructor's Course for Construction (September 20-23, 2004) Four-day course. This program will be offered through the Keystone Occupational Safety and Health Center (KOSH) – an Authorized OSHA Training Institute. Call them at (800) 318-4846 or visit their website www.koshcenter.org to register.

OSHA 30-Hour General Industry Course (October 18-22, 2004) Five-day, OSHA-authorized course. 4.5 ABIH CM points. Tour a VPP STAR site as part of this course.

Topics in Safety Management (December 2-3, 2004) Two-day course. Designed for the safety manager with five or more years experience in the safety field.

NOTE: All of our prior newsletters are archived on our website under the "Contact Us" Tab

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