CSI NEWS

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HEXANE SHEXANE

Recently, newsletters have been circulating to auto industries highlighting the toxic effects of hexane, a chemical commonly found in brake cleaners. The toxic effects such as peripheral neuropathy (damage to nerves) from exposure to n-hexane have been known for over two decades. The safe exposure limits for hexane specified by governmental agencies has also been 50 ppm for a while.

Problem: Research conducted by physicians and at UC-Berkeley in the last year has indicated that shop technicians' overexposure to n-hexane over the long term has caused damage to nerves in the feet, legs, hands and arms. The California Department of Health Services, Hazard Evaluation System and Information Service issued an advisory in June 2001 disseminating information regarding the harmful effects of n-hexane being used in vehicle repair. The advisory states that symptoms from over exposure to n-hexane include numbness, tingling, weakness in affected body parts, and reduced ability to feel touch, pain, vibration and temperature. Short-term effects, which disappear within hours of cessation to exposure, include headache, dizziness and drowsiness. Now the real issue to employers is how to ascertain if n-hexane is present in shop chemicals.

Find: A quick way to determine the presence of n-hexane is to review the Material Safety Data Sheet for the aerosol cleaner used in the shop area. The n-hexane ingredient in the cleaner may not be labeled as n-hexane as most manufacturers use commercial grade hexane. Hexane and n-hexane have similar atoms which are tied differently on a molecule. Just imagine them to be two similar models of an automobile with varying options! Now, the commercial grade hexane used in aerosol cleaners has about 50% n-hexane. We do this dichotomy between hexane (with no n-hexane) and n-hexane because of the difference in their harmful effects. Cal-OSHA permissible exposure limits (PEL) for hexane (PEL 500 ppm) is ten times that for n-hexane (PEL 50 ppm). In essence, one can be safely exposed to 10 times of hexane compared to n-hexane. The presence of other chemicals in the cleaners such as acetone and methyl ethyl ketone makes the damage to nerves more likely. To make matters worse, these are some of the chemicals found in aerosol cleaners with hexane. Harmful exposure of n-hexane to an employee can be determined by an occupational medical physician through medical tests including a urine test.

Cure 1: Once hexane is found on your work premises, steps should be taken to reduce exposure immediately. A sure shot way is to replace the n-hexane in aerosol cleaners. Increased ventilation, employee monitoring, providing personal protective equipment such as gloves and respirators, and employee training can also help reduce exposure. Though the list of replacement chemicals is extensive, they too have some harmful health effects. A survey of aerosol cleaners that contain n-hexane is enclosed.

Cure 2: The potential chemical candidate for hexane replacement is heptane. The PEL levels for heptane are 500 ppm with a better fire safety factor. Harmful health effects from heptane include irritation to mucus membranes and narcosis that can occur at higher exposures. **But:** In the South Coast Air Quality Management (SCAQMD) area, the users are limited to aerosol cans with hexane or heptane to 160 oz. per day. This is part of the law that allows each employer to utilize aerosol cleaners with greater than 50 grams per liter (g/l) of VOC to a maximum of 160 oz. per day.

In SCAQMD jurisdiction, the other options are acetone or water based cleaners. Acetone has an irritable smell and damages plastic and rubber parts. With a flashpoint of 0° F, it is also highly flammable. Low flame temperatures also make

acetone difficult to extinguish once it catches fire. The only other choice for cleaning brake parts would be an aqueous based parts cleaner. Tabletop washers with Stoddard solvent are banned in SCAQMD jurisdiction. Of note, SCAQMD is tightening the rules on water-based cleaners too. As of January 1, 2003, only 25 grams per liter of VOC are allowed in water-based cleaners versus 50 grams per liter presently.

For those of us who are not in the SCAQMD jurisdiction, the Stoddard solvent is probably the best cleaning material. With great cleaning efficiency for oil, dirt and grease laden parts, it is considered to be safer than most other organic solvents. θ

MOLD IS GOLD

Mold found inside buildings is gold, at least to lawyers and remedial contractors. For the rest of us, it is one big headache.

The concern over mold has become active in the last few years with multi-million judgments issued against contractors for building defects where water leaks have left mold inside building. For example, a building in San Diego that cost $5.5 million to build had an $11 million price tag associated with mold cleaning activities. It seems that mold lies in the same line of euphoria as other toxics inside buildings over the years. Earlier it was asbestos, then radon, then lead paint and now mold. Believe us, this one is not going away. Mold has been with us since times immemorial. Romans used it for making wine. They talk about it in the Bible as well. The problem is so widespread and the repair so expensive that insurance companies are excluding mold damages from all new building policies.

With a great amount of media attention and large damages being paid out, it makes sense to understand the concept of mold as an indoor air quality threat and to undertake remedial actions promptly. Laws are also being enacted to protect employees and residents from mold in buildings. In California, laws went into effect this January that require anyone selling, leasing or transferring property to disclose any potentially dangerous mold problems.

Mold can cause allergic reactions, fungal infections, and other health effects. Allergic reactions, similar to common pollen or animal allergies, are the most common health effect of Mold. Allergic and other illnesses can be treated by getting rid of mold. Physicians can prescribe medication to control mold symptoms as well. The dealership should train employees to report mold problems when they see or smell any. If employees suffer from mold related problems, they should report it to the dealership safety coordinator or their manager.

Mold needs moisture and a food source (organic material) such as wet/damp walls, carpets, ceiling, wallpaper or the dust in the HVAC system. Indoor moisture leading to the growth of mold may come from flooding, leaks, high humidity or steam. Typically, fungus start to grow when the relative humidity exceeds 50 percent. The higher the humidity, the more types of mold and the faster they grow. Wall areas protected by pictures or furniture would also support mold activities. If mold is detected, a remedial action should begin immediately. One should also contact their legal counsel for guidance and insurer for reimbursement related to damages.

Priority should be given to stopping the water leak. If moisture is present, the mold will return. So the source of moisture must be eliminated and the building properly maintained. Relative humidity in the HVAC system should be maintained at 45% $\pm$ 5%. The remediation contractor will probably replace the sections of the wall damaged by the water leak and supporting mold. Painting over mold is generally not considered a viable option. If mold has spread to air conditioning and heating ducts, remedial steps need to be taken there as well. Furniture damage with mold needs to be repaired or refurbished as well. Recently, the LA Times reported that McMahon, the famous TV personality, sued his insurance company for $20 million for damages from toxic mold that spread through his home after contractors cleaning up water damage from a broken pipe botched the job. In summary, good consultants along with contractors performing a prudent job helps. θ

THE GOOD, BAD, AND UGLY

MTBE addition to gasoline was supposed to be good for the environment but instead turned out to be polluting groundwater and now it is turning into an ugly political battle.

Federal law requires that areas such as southern California add an oxygenate such as MTBE to gasoline to improve combustion efficiency, thereby mitigating air pollution problems. The problem

with MTBE is that it has leaked to underground water supplies and caused contamination. EPA classifies MTBE as a probable carcinogen, and has issued an advisory urging the public drinking-water systems to provide alternative supplies if the MTBE levels of water reached 20-40 ppb range. Humans can detect the MTBE's unpleasant taste and smell in that range.

In California, with a 5 ppb standard for MTBE in spite of the federal advisory, things have gotten tougher. Santa Monica has shut down 7 of its 11 drinking water wells because of MTBE contamination and lawsuits have been filed against gasoline suppliers to recover costs associated with cleanup. South Lake Tahoe has also found contamination in 12 of 34 wells. The problem is far from acute. MTBE in the 1-26 ppb range has been found only in 48 of the 3200 drinking water sources. The gasoline suppliers have a defense. You guessed it, the law required them to add MTBE!

California was to ban MTBE in gasoline as of January 1, 2003. Experts believe that phasing out MTBE on that date would cause fuel-supply disruption and price increases from 50% to 100%. Governor Davis issued an executive order in March delaying the ban to December 31, 2003. Also delayed was the implementation of California reformulated gasoline Phase 3 (RFG3) that was to be cleaner burning than the RFG2 currently in use.

California's woes are far from over. MTBE replacement is supposedly ethanol coming from midwestern farm states. Replacing MTBE would require 900 million gallons of ethanol to be shipped into California, which exceeds the transportation and storage capabilities. It would get ugly with the supplies disrupted and the price hikes. A waiver from the feds on the addition of MTBE does not look promising either. A California request for a waiver from the federal oxygenate requirement was denied in 2001. In summary, MTBE was one good thing. Its usage turned out to be bad for the environment and now downright ugly. θ

SUE SUE SUE

It seems one can be sued for a good reason, bad reason or no reason at all. Recent California rulings should at least reduce the lawsuits for the no reason category!

The Rule: Workers' compensation laws protect an employer from lawsuits, in general, from an employee for injuries that occur on the job. Serious and willful injuries are not covered by the immunity.

Lawsuit: The injured employee could however sue the entity that had hired the contractor for negligence etc..

Recent Appellate Court Ruling: The employees of the contractor may not sue entities that hired the contractor on the basis that it owed a duty of care to ensure safe working conditions for contractors and employees and fails to carry out that obligation.

In the case at hand, an employee was killed when a steel frame for excavating trenches collapsed on him. As the employer of the deceased was immune from lawsuit under worker compensation doctrine, the estate sued the entity that hired the contractor on grounds that it failed to provide safe working conditions that led to the fatality.

The court in dismissing the lawsuit against the entity that hired the contractor stated "*In the absence of direct management over the means and methods of the independent contractors work or provision of the equipment which caused the injury, no legal duty is created*". Conversely, if the owner of the property retains control over the operative details of the hired work (contractor), the owner can be held vicariously liable for injuries.

In summary, when hiring contractors, obtain legal counsel to review contracts, have sufficient disclaimers, and hold harmless language added to protect owners from injuries and accidents on the job. General liability and workers' compensation insurance for the contractor and its employees should also be retained on files. (*Reference: Alvarado v. Metropolitan Water District of Southern California)* θ

IT HAPPENED IN HOLLYWOOD

One fine Sunday afternoon, a few months ago, motor oil was observed to be running on the streets of Hollywood. The source was later found to be an automobile dealership. The local fire department responded with a cleanup contractor, and mopped the oil with an absorbent, and sent dealership the bill. Luckily, no oil had reached the storm sewer and a disaster was averted. The cause of the spill and the steps to avert such disasters in the future is a lesson for all in the service business.

A month earlier, an outside technician had replaced/repaired the hose for overhead dispenser unit in the shop area. Later the hose connection

became loose as a result of a faulty product and the pump started dispensing oil. The compressor had been shut off for the weekend but there was enough air in the air tank to empty the entire lube oil tank. The lube oil went from the shop floor to the lot and later to the city street. Cleanup of the entire lot and service department had to be undertaken as well, along with the cleanup performed earlier by the fire department. The price tag, the dealership did not wish to disclose.

The remedial measures to avoid such disasters are straightforward. During non-shop hours, one has to cut-off supply of air to the pump that moves oil from the tank to overhead dispensers. While most of the dealerships shut off their compressors manually or with a timer, air is still retained in the air tank below the compressor. At times, this air can be sufficient to empty an entire lube oil tank in the event of a leak in any of the hoses or piping. Some remedial measures to stop the air to the pump are as follows:

- Place a solenoid valve with a timer in the air-line. With the help of a preset timer, the valve will automatically shut-off air to pump during non-shop hours.
- Though prone to human errors, a hand-operated valve would do the same job as shutting the air as above. However, shop staff must be trained to perform such acts on a diligent manner.
- Keep compressors on a timer so as to have them shut down during non-shop hours and institute procedures to bleed air out of the system at the end of the shop day. This may require 10-15 minutes every morning to get the compressed air running.

The procedures are relatively easy and inexpensive to install as compared to the potential for an expensive and troublesome disaster.

Dump Chlor

NO, it is not a stock we are asking you to dump! If you have any aerosol cleaners with the word "*chlor*" in them, you cannot use them after 2002. The State of California has approved an Air Resource Board Regulation that prohibits aerosol cleaners containing chlorinated products.

The new regulation will reduce chlorinated exposure to public by requiring manufacturers to stop using these compounds in products such as liquid brake cleaners, carburetors, fuel-injection air intake cleaners, engine degreasers, and general-purpose degreasers. The regulation went into effect July 1, 2001 with the enactment dates as follows:

- Products manufactured before June 30, 2001 can be sold in California until July 1, 2002.
- After December 31, 2002, owners and operators of service stations, auto repair shops, new and used car dealerships and fleet operations are prohibited from using the products if they contain "Perc", "MeCl" or "TCE".

The facilities can use only non-chlorinated products. The only way to ascertain if they contain *chlor* or the family of compounds is to review Material Safety Data Sheets. Any products with *chlor* should be returned to the vendor for credit or exchange by December 31, 2002. Dealers should not have difficulty replacing *chlor* containing products as some of them replaced them a few years ago to eliminate waste oil contamination.

Waste oil generated in the shops is usually recycled for minimal expense by the dealership. However, if *chlor* products contaminate the oil, the disposal can be $2-3 per gallon of waste oil. The reason for excessive disposal costs is that such oil cannot be burned as bunker fuel by ships as they produce dioxins, cancer causing chemicals. Chlorinated oil needs special expensive treatment and hence the high price tag. The source of *chlor* in waste oil was typically from aerosol cleaners being used by technicians for brake cleaning that would find its way to the waste oil pan. Dealers at that time removed *chlor* products from shelves. In any case, if you are still using *chlor* products while keeping waste oil *chlor* free, now's the time to finally get rid of them.

Replacement may not be an easy decision. Hexane, once a good substitute is now out of fashion. See article Hexane Shexane in this newsletter. Hexane free aerosols or water based cleaning units may be an answer. In any case, say goodbye to *chlor* products in California. Lastly if history is any forecaster of things to come, other states will follow suit and prohibit *chlor* products.

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