Bacteria in Lathe Cutting Fluid

Here is a safety alert from a refinery involving an incident caused by a machinist being infected with bacteria in cutting fluid at a lathe. One of the machinists was working at a large automatic band saw hack saw when he noticed that the cutting fluid had stopped flushing over the work-piece. He stopped the saw and elevated the blade, then engaged the lift pin on the blade assembly, completing each task according to safety recommendations. He then lifted out the screen basket that catches the metal cuttings. The basket had over-filled and clogged the sump-pump in the cutting fluid sump. The machinist cleaned the basket then reached into the sump to scoop out the rest of the cuttings. He did this barehanded.

The machinist told the investigation team later on that most of the machinists typically will have small cuts or puncture wounds on their hands from handling very sharp tools, metal shavings, or metal cuttings. None of the machinists wear gloves or loose clothing when they work because of the danger of catching them up in the rotating equipment. This person was no exception. Most of them said they occasionally wear rubber gloves to clean out sump cuttings, some do not.

Several days later, this machinist was admitted to a local hospital with a deep tissue infection and a fever of 103 degrees. The doctors treated him with some very potent antibiotics and he eventually responded well. The machinist missed three days work and was returned on limited duty for two more days.

The employee is doing fine now. The doctor's report noted a serious infection had begun when a bacterium that was growing in the cutting oil sump entered the employee's hand through two small cuts on his right index finger. The report further stated that had the employee waited another 18 to 24 hours to seek treatment, he might have lost his finger, or even his entire hand to the infection. Microbiological testing of the contaminated cutting fluid indicated that one strain of bacterium growing in the cutting fluid is a very toxic Pseudomonas variety, which produces a neuro-toxin in biological hosts. (The waste material from certain Pseudomonas bacteria is a cell necrotizing agent. That is to say, it begins to digest you from the inside kind of like the Ebola virus does).

Further investigation revealed that the MSDS's for cutting oils (Soluble Oils) do not mention their potential for hazardous biological properties after they are properly mixed with water to form a cutting fluid emulsion. When freshly mixed, metal working fluids are relatively harmless (no biological hazard exists). But, with use and time, these fluids may begin to harbor dangerous microbial growth. The instructions for this particular oil say to mix it 8 parts water to 1 part oil and blend to form a good cutting fluid emulsion. The oil does not contain a biocide and there is no recommendation to add biocides. There is also no recommendation for a cutting fluid change-out schedule (this is typical of most metal working fluids). The machinists said they will usually change out the oil when it stinks, otherwise they will just add some occasional make up fluid. The plant's microbiology group determined that the soluble oil itself is not a problem. It MUST be mixed with water to become a growth environ for bacteria. The bacteria will live in the water phase of the emulsion and feed off the oil phase. Without a biocide, there is absolutely no control over the type or number of bacteria that can "take root" in the cutting fluid emulsion.

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