

# The Cost of Uncertainty: Nanotechnology Could Be Risky Business

By George W. Pearson, CSP, ARM

**T**he shortage of health, safety and risk control information related to nanotechnology could negatively impact business. This impact could be gauged by how the insurance industry reacts and how it will ultimately respond to this emerging technology. The insurance industry's concern is underscored by the knowledge gaps surrounding the safety and health hazards of nanoengineered materials. Among the risk categories are worker injury, third-party liability, personal injury and product recall risks. Further, consumer concerns also could drive a backlash reaction that could raise concerns among insurers in products liability.

In its 2004 report, "Nanotechnology Small Matter, Many Unknowns," Swiss Re believes that so much uncertainty exists in nanotechnology risks that it does not have a precise way of calculating the probability and extent of loss which could occur. In addition to how the causal relationship between the agents to the illness can be established, Swiss Re is concerned about accumulated losses from a flood of late claims. The report suggests that insurers limit their commitment to the nanotechnology market to avoid unknown liability risk. Studies needed for risk assessments have failed to emerge because of shortfalls with research funding. They predict that insurers can expect to face these uncertainties for some time (Hett, 2004).

Swiss Re also cites concern over the chronic nature of ill effects from exposure to nanomaterials. They draw an analogy to asbestos, admittedly causing a controversy, but make their case because of several similarities between asbestos and nanotubes.

"The danger is most probably not of an acute nature, but of a chronic nature, and it could be some time before it manifests itself. That is the real risk for insurers, and the comparison with asbestos should be seen in this light" (Hett, 2004).

Nanotubes, a type of nanoengineered material, in particular could compare readily with asbestos. Swiss Re asserts that they are similar in shape and size, structure and

form. They both cause or could cause chronic disease, and although the risks with nanotubes are unknown, it is clear that asbestos causes fibrosis of the lung (asbestosis) and lung cancer (mesothelioma). Similarities are striking; they are both in or will be in worldwide distribution and have a wide range of uses or applications. This means a large population was or can be exposed in the future. Where asbestos is persistent in nature, nanotubes are possibly so. Asbestos has had a storied past with large employee claims and class-action suits. These claims were costly to asbestos producers and insurers alike and were responsible for large losses. With nanotubes, such a trend is really not predicted, but with that comparison, it underscores the risk because of the unknown consequences of exposure and the uncertainty surrounding delayed reporting of large claims.

Alliance AG, the German-based insurance conglomerate, believes causal relationship will be difficult to establish between the actions of an insured and a resulting injury or illness (Lauterwasser, 2005). Negligence requires that an injury have proximal cause that is a breach of a duty to protect. If proximal cause cannot be established, an indemnity claim based on negligence would not be possible. Workers' compensation conversely is a no-fault system, but it also relies on a principle of causal relationship. To be compensable, an injury or illness must arise out of and in the course of employment. These relationships expect to be difficult to prove according to some. They say a more affirmative view of nanotechnology will be evolutionary (Lauterwasser, 2005).

The insurance industry seems to be resigned to the fact that it will need to cope with the uncertainties of nanotechnology-related risks. Accordingly, they now are unable to quantify the probability and possible extent of related losses. Lines of affected insurance business will include:

•**Workers' compensation.** Workers developing, synthesizing and processing engineered nanomaterials.

•**General and products liability.** The general public and users of consumer products containing or releasing nanomaterials.

•**Product recall.** The cost of recalling a product with unacceptable claim experience or safety defects covered in some insurance policies.

•**Environmental liability.** Damage to the environment from engineered nanomaterials disposed of or released into the environment intentionally or accidentally.

•**Property losses from dust explosions.** The fine particle size of engineered nanomaterials could cause ignitable dust to form. The property damage as a result would be payable under many property insurance policies (Lauterwasser, 2005).

From this, it is expected that many domestic insurers will wait to take an approach. One insurance executive says that he would like to see how the claim trends track before assessing the further impact of nanotechnology on the industry. It is possible that some insurance companies will be more aggressive in seeking market segments or niches to find a comfort zone in which they can live. By carving out the pieces they technically understand and in which they have confidence, they will be able to operate in the daylight, so to speak.

Unfortunately, these niches will probably be very small, likely resulting in too little property and casualty insurance available for purchase, thus creating capacity issues for the market. Based on the Alliance and Swiss Re reports, it does not seem likely that insurers will take the drastic step of expressly excluding coverage for nanotechnology risks. They remain ambivalent and seem reluctant to enter into a debate over whether they should or should not.

On the consumer front, Consumer Union recently reported on nanotechnology and revealed some startling issues (*Consumer Reports*, 2007). They state that "consumers have been left in the dark," probably because no one is telling them about nanotechnology. Based on a Yale University study, 80% of Americans

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have never heard of nanotechnology. Businesses in the consumer market do not advertise whether their products contain nanoengineered materials because they do not want to be exposed to bad publicity. The concern is in informing the public and a fear of a consumer backlash.

International Council on Nanotechnology (ICON), of which Consumer Union is a member, released a report in 2006 that surveyed 64 manufacturers and laboratories. Only one in three conducted monitoring for exposure to substances; about 38% believed nanotechnology posed no special risk; and 22% said they did not know. The remaining group said they had risk concerns. This head-in-the-sand approach is likely to cause product liability insurers to cringe and businesses to suffer in the long run. Here emerges an element to add to the uncertainty where some businesses are unwilling to admit to the current predicament.

A common interest among insurers is the preservation of their book of business in all lines of coverage, including general liability, workers' compensation and products liability. This could cause domestic carriers to shy away from insuring nanotechnology risks. If insurers are unwilling to assume risk, how will organizations and businesses manage their risks where risk financing through insurance is not an option? This situation will likely limit the availability of insurance coverage for emerging businesses engaged in nanotechnology. If insurers do as Swiss Re and Alliance predict, the wait-and-see approach could turn into an economic debacle.

Not unlike the pollution issues of the 1970s and 1980s, insurers found that because of the uncertainties related to environmental risk—too much risk and not enough premium—they began to write policies by excluding environmental risks. When they wrote environmental coverage, they did it claims-made. We also can anticipate debates over causal relationships and the expectation of clusters of claims and late claims. This could force the industry to exclude coverage, be selective with exposures and seek other methods to limit their exposure, such as offering claims-made coverage. The latter may be impossible with workers' compensation, particularly here in the U.S.

and probably in Canada because of the state and provincial workers' compensation statutes. Limits will be placed on availability of insurance coverage for businesses and organizations, which could severely limit risk transfer protection against claims. Insurers should think of funding research or collaborating with health and science organizations to advance the body of knowledge concerning nanotechnology risks.

### Taking a Prudent Approach

For a responsible business, a pound of prevention is worth a pound of cure. It makes business sense to control losses and to invest in controlling and mitigating loss-producing exposures, particularly with

**Better understanding nanotechnology risks is a significant step to the better understanding of hazard controls and mitigations that are key to controlling losses and countering negative business impact.**

nanoengineered materials. In fact, a 2001 Liberty Mutual survey of business executives "... shows 61% of executives say \$3 or more saved for each \$1 invested in workplace safety" (Angevine, 2001). It makes sense for businesses to be prudent upon entry into the fledgling nanotechnology arena. It also means a business should be conservative in its approach to processes and handling of nanomaterials and invest in precautions.

Implementing the appropriate risk controls and precautionary methods outlined in the NIOSH interim safety and health guidelines is a start. Formulate and implement a risk management program to control the risk. As NIOSH suggests, the following are the key program elements for a nanotechnology risk management program:

- Evaluate the hazards.
- Assess worker exposures.
- Educate and train employees.
- Establish methods to evaluate the effectiveness of engineering controls.
- Develop procedures for the use of personal protective equipment (PPE), including the use of clothing, gloves and respiratory protection.
- Follow up with a systemic evaluation of exposures and control measures to be sure risk control interventions are effective.
- According to NIOSH, current knowledge indicates a well-designed exhaust ventilation system with high-efficiency air (HEPA) filters should be effective in removing nanoparticles in use today.
- Good work practices also are essential in achieving risk controls that mitigate exposure. This includes cleaning work areas with HEPA vacuums, using wet methods, preventing employees from eating food in work areas and providing adequate hand-washing facilities (NIOSH, 2006, 2007).

Without economical access to insurance or with insurance limited as a feasible risk transfer option, ventures into nanotechnology may be put off or decided against completely and become an economic constraint that holds back the fullest exploitation of nanotechnology. Consumer confidence also can play a key role in the general acceptance of nanoengineered materials in products. These can be seen as a risk management gap but also as an opportunity that can be exploited by astute business interests and insurers alike.

The curiosity of business and the insurance industry can be marshaled to solve this problem and result in productive investigations in how nanotechnology hazards can be adequately controlled and mitigated. This conundrum could end up having a bright side and be a stimulus for private and public funds for research to learn more about nanotechnology risks.

A bottom line factor for business is the control of costs. A risk management adage says, "By controlling losses, you are controlling your costs." Better understanding nanotechnology risks is a significant step to the better understanding of hazard controls and mitigations that are key to controlling losses and countering negative business impact. ■

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## Historical Buildings

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terms or forms available in case repairs are needed? Are plaster moldings, trim and rosettes inspected periodically for cracking or separation from the walls? If crown moldings and trim are wood, is the design standard or readily available? Have gas illumination lines been either removed or marked and capped at each end to prevent accidental reconnection?

Dumbwaiters are common in older high-end construction. Are all unused chases and openings between floors sealed to prevent spread of fire and smoke in case of fire? Have all interior natural stone surfaces been identified as to type and source in case replacement is necessary? If door and window hardware is custom-made, has the original or a replacement supplier been identified? If lighting fixtures are custom-made, are an adequate number of spares on hand for replacement, and has the supplier information been recorded for retrieval when required?

## Maintenance & Repair

Have contractors been identified who are capable of working on unique construction characteristics of the building? Has the estimated time to repair unique building systems been included in insurance coverages?

Historical structures are the texture of our heritage. To walk the halls where the first U.S. president lived out his retirement, visit where one of the authors of the Constitution mulled over word choice, or see the realized vision of an architect who rocked his world—these are worth protecting for our children. We are in a position to ensure that this happens. ■

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Mark D. Oldham, CSP, of risk management services with Fireman's Fund Insurance Co., was engaged in the research of historical building risk management issues and development of a portfolio of coverages designed specifically for historical buildings. He is the current Risk Management/Insurance Practice Specialty Administrator.

## Correction

In the Vol. 6, No. 3, issue of *RM/Insight*, former Manufacturing Branch Co-Chair Todd Ravazza's name was listed incorrectly in a photo caption.

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George W. Pearson, CSP, ARM, is the immediate past administrator of the Risk Management/Insurance Practice Specialty and the assistant regional vice president, practices and standards, for Region VI. He is the corporate health and safety manager for SunCom Wireless in Richmond, VA. He can be reached at [gpearson@suncom.com](mailto:gpearson@suncom.com).

## Administrator's Message

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the competitors' enthusiasm and knowledge were exciting to be near. I came away from the competition with renewed confidence in American workers, their motivation, drive for quality and their abilities. I also came away with renewed professional motivation. Clearly, the effectiveness of

## Using Insurance to Manage Risk & Control Losses

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**RMI:** What are PCI's plans and goals for this year?

**KL:** This year, PCI is focusing on minimizing catastrophic loss exposures. We are interested in advancing state and federal programs that support stronger building codes, provide mitigation incentives, increase awareness of the need for and benefits of mitigation, assist risk bearers in understanding and implementing mitigation measures, minimize inefficiency in mitigation programs and fund and coordinate mitigation research. These kinds of programs affect the degree of risk and the costs of managing them. We will also look at a handful of states that regulate insurance loss control services to see if we can bring some added effectiveness and efficiency. ■

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Prior to joining PCI, Keith Lessner addressed safety, environmental and loss control issues at the Alliance of American Insurers for 22 years.

Lessner holds undergraduate and graduate degrees in economics from the University of Missouri, and he has completed advanced course work in international economics and business at Syracuse University.

their safety and technical education was exceptional.

The next time one of my prospects or clients comments on not being able to hire skilled workers, I know they exist and can be found. It matters with whom you choose to associate.



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