

# OCCASIONAL PAPER SERIES

**No. 4: NATIONAL HEALTH STRATEGY**

**1999/2000**

**FLOORING CONTRACTORS**

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# **Executive Summary**

In 1999/2000 one of the OSH national initiatives focused on the flooring industry. The aim was to assess the hazards presented by exposure to asbestos and solvents within the industry, and, where necessary, to take corrective action. This document examines the first section of the study and, in particular, comments on the practices observed for the removal of vinyl asbestos flooring.

Nationally 94 audits were completed with contractors that indicated they were actively involved in working with flooring that may contain asbestos.

The results of the study clearly indicate that there is a variety of work practices being used throughout the country, not all of which are compatible with taking “all practical steps” to minimise workers and other people’s exposure to airborne asbestos fibres.

After taking into consideration the results of this study and information available about incidents that OSH has investigated, recommendations have been made for changes to the guidelines for work on vinyl asbestos floor coverings.

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# **Introduction**

Currently the standard expected by OSH of a contractor removing flooring that may contain asbestos, is compliance with the Health and Safety in Employment (Asbestos) Regulations 1998<sup>(1)</sup> and the *Guidelines for the Management and Removal of Asbestos*<sup>(2)</sup>. The audit that formed part of the study examined adherence to the relevant information in these documents. The section from the guidelines that specifies the precautions to be taken when dealing with vinyls that may contain asbestos is reproduced in the appendix.

## **Background on the products involved**

It has been recognised for many years that flooring products used in both domestic and commercial buildings in New Zealand contain asbestos. It would appear that “vinyl” floor coverings laid from the 1960s up until the late 1980s commonly contained asbestos. The products can be grouped under two distinct categories, solid vinyls and sheet flooring. Solid vinyls are usually in the form of tiles that have a 10 to 20% asbestos content, with other mineral fillers incorporated into the matrix of the product. The sheet flooring on the other hand consists of a relatively thin plastic layer, backed with layer of asbestos compressed with a latex binder to form a felt. The earlier of these sheet products were sometimes referred to as lino, probably reflecting similarities with an earlier flooring, “linoleum”, made up of a canvas backing and a linseed oil based polymer on the top layer. While the term “vinyl” is now commonly used, not all of the products are made from polyvinyl chloride, with urethanes and other plastics also being used for the top wearing surface.

Both the vinyl tiles and the sheet flooring incorporating asbestos present potential health problems for the people removing the products and the occupants of the building. When the sheet flooring is removed the backing has a tendency to split, with a layer remaining stuck to the floor by the adhesive. As it is difficult to completely remove the backing and the adhesive, the floors are often sanded in that state to prepare them for laying replacement floor coverings or returning wooden floors to their original condition for polishing. This clearly has the potential to generate significant levels of airborne asbestos fibre. Vinyl tiles can also be difficult to remove and chipping and sanding operations can also release asbestos fibres.<sup>(3)</sup>

## **Development of current guidelines**

The health and safety concerns associated with removing vinyl or asbestos flooring have been recognised in New Zealand for a number of years, but it wasn't until approximately 1992 that the issue began to receive close attention from OSH. In 1992, Ken Sheat, at the time an Occupational Hygienist with OSH's Christchurch North Branch, carried out an investigation into the work practices of floor sanders in Christchurch<sup>(4)</sup>. In the same period there were reports from around the country about houses being contaminated by asbestos, as the result of floor sanding jobs gone wrong.

In the Christchurch study air-sampling tests clearly indicated that dry sanding a floor containing asbestos residues generated asbestos in air levels well above the Workplace Exposure Standard of 1 fibre/ml (chrysotile asbestos). In one sample a level of 27 fibres/ml was recorded during sanding. When the floors were wet sanded using kerosene, asbestos

levels were considerably reduced and generally below 1 fibre/ml. The investigations in Christchurch and discussions between OSH and the industry contributed to the development of recommended work practices, that were incorporated in the OSH *Guidelines for the Management and Removal of Asbestos*.

## Health issues

Inhalation of asbestos fibres can result in asbestosis, cancer of the lung, mesothelioma and plural diseases.

? The current Workplace Exposure Standard (WES) for chrysotile asbestos is a level of 1 fibre/ml of air averaged over any 4-hour period.<sup>(1,5)</sup> The risk of developing lung cancer from chrysotile asbestos has been linked with the total exposure over a lifetime.<sup>(6)</sup> While there is certainly some debate over the protection that the current WES provides, there is general agreement in the literature that the risk becomes difficult to measure above background where lifetime exposure is below an average of 50 fibres/ml.<sup>(7)</sup> Assuming that the relationship between lifetime exposure and risk of disease is linear, it has been estimated that the risk of developing lung cancer would be increased by 0.5% if a person was exposed to an asbestos level of 0.5 fibres/ml over a period of 20 to 30 years.<sup>(7)</sup>

Short-term asbestos fibre exposures experienced by floor sanders during the dry sanding of vinyl residues are likely to be well in excess of 1 fibre/ml, and the 4-hour WES could well be exceeded during a typical job. Whether the longer term average exposure experienced by those in the industry would be likely to approach current workplace exposure standards is more problematic.

It is not the risk that the activity presents to the workers, but concern about the occupants of houses and other people that the majority of the controversy has focussed on. In these situations the reference standard is 0.01 fibres/ml. This is the “clearance level” that is to be achieved before an area where asbestos has been removed is reoccupied, and it is also applied to situations where people may be exposed to asbestos but are not actually working with asbestos. There is no information available on the asbestos in air levels that are likely to persist in a building that has been contaminated with sanding dust that contains asbestos. Given the results of tests that have been carried out immediately after a sanding job has been completed, it would seem that the longer-term exposures would be below 0.01 fibres/ml.

There are numerous incidents recorded where the settled dust spread throughout a building has been found to contain asbestos, supporting the likelihood of an ongoing low-level asbestos fibre exposure to the occupants. For occupational carcinogens such as asbestos it can be argued that there is no lower limit of toxicity and that lower exposure levels continue to provide a risk, albeit a slight one. It is stressed that at the levels that are likely to exist, this is a theoretical risk and cannot be supported directly by data from human studies.

Regardless of any scientific evaluation of the risk presented by low-level asbestos exposure, there is a public perception of risk that cannot be ignored.

## Requirements under the Health and Safety in Employment Act 1992

There is a general requirement under the Health and Safety in Employment Act 1992 (HSE Act) to eliminate or control exposure to significant hazards. For asbestos these principles are spelt out more specifically in the Health and Safety in Employment (Asbestos) Regulations

1998. It is noted that these regulations, unlike the legislation they replaced, focus on applying controls to eliminate or minimise exposures to airborne asbestos fibres and not simply ensuring that the levels are maintained below the Workplace Exposure Standard for asbestos.

Regulation 2 classifies dry sanding of floor coverings containing asbestos as restricted work requiring the work to be carried out by, or directly supervised by, a person who holds a relevant certificate of competence.

Regulation 7(2)(a) states: (2) Every employer must take all practicable steps to ensure that—  
(a) The release of asbestos fibres into the air is suppressed.

Regulation 13 requires steps to be taken to ensure asbestos waste is contained and disposed of safely.

It is noted that in the HSE (Asbestos) Regulations the interpretation of employer is extended to include “a person who controls a place of work”, and “a principal who controls the place of work at which a contractor or subcontractor works”.

The *Guidelines for the Management and Removal of Asbestos*, and the *OSH Guide for Work on Vinyl Asbestos Floor Coverings*, provide practical steps that can be followed when wet sanding a floor that may contain vinyl asbestos flooring residues. These steps are reproduced in the appendix.

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# Results

Overall, 103 audits were completed nationally with flooring contractors that were considered to have some involvement in replacing vinyls that may contain asbestos. Ninety-four of these provided either a definite or tacit indication that they were actively involved in working with the vinyls. Nine contractors suggested that when they come across a product that may contain asbestos, they always refer the work on to a specialist and have no further involvement. A somewhat larger proportion indicated that once they had knowledge that the vinyl contained asbestos, they wouldn't touch it. A number of the audits were completed with flooring retailers, vinyl and carpet layers, or others who weren't directly involved in preparing floors. The information provided by some of this group has assisted in gaining an overall picture of the situation, but the data provided has not been included in the following analysis of the results.

## Identification

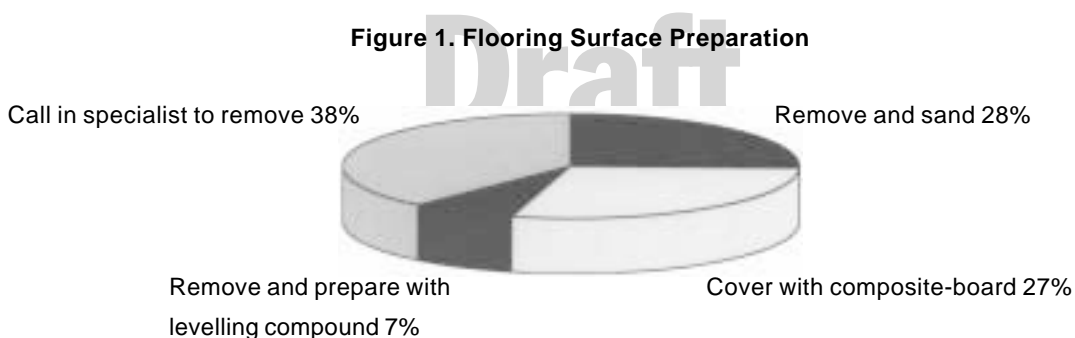
The contractors were asked to comment on the procedure they use to identify whether or not the floor covering they are dealing with contains asbestos.

Sixteen percent of contractors said that they use laboratory testing to confirm whether or not a product contains asbestos. This included those that indicated they send the material to the lab themselves and others that rely on the principal or client to do this. Some suggested that they would only do the work if their client had had a sample tested. The majority of the contractors relied on a combination of visual inspection and age of the product. Five contractors included an ignition test in the process they use to decide if there is asbestos present. One provided detail on the procedure, pointing out that the fibres were visible once the ignitable material had been burnt off.

## Techniques used for removing floor coverings

The preferred approach for dealing with vinyls that may contain asbestos in the backings varied considerably. A large proportion of the contractors (38%) indicated that once they had established that the product contained asbestos they wouldn't touch it, leaving it to a specialist to remove it. In one region of the country in particular, the practice seems to be to get a contractor with an asbestos certificate of competence to remove the vinyl prior to the flooring contractors coming in and sanding the floor. In only three cases was there an indication the flooring contractor himself held an asbestos certificate of competence.

Figure 1. Flooring Surface Preparation



There was an even split between the contractors that covered the existing flooring with hardboard or similar products (27%) and those that generally remove it (28%). Seven percent suggested that their preferred approach was to remove the vinyl by scraping and then use a levelling compound to prepare the surface for relaying. Other contractors suggested that:

1. They follow the house owner's requirements.
2. The house owner is asked to remove the vinyl.

## **Floor preparation techniques**

A number of contractors (17%) admitted that at some stage they had dry sanded floors after vinyls had been removed. This included 4% that emphasised they ensure that all vinyl that may contain asbestos was completely removed before they began sanding. Wet sanding was routinely carried out by 27% of the contractors. The majority of these used kerosene with a few saying they use water on concrete floors.

A disappointingly small number of contractors demonstrated that they took reasonable precautions to contain asbestos contamination to the work area. Of the contractors that indicated that they sand floors after vinyls have been removed, only 28% provided evidence that they took any of the precautions specified in the asbestos removal guidelines to limit the spread of asbestos (such as taping doors and isolating the area with plastic sheeting).

## **Clean-up**

While there was a poor response overall to the questions relating to clean-up after sanding, it appears that the use of vacuum cleaners fitted with HEPA filters is poor with only nine contractors specifically stating that their cleaner has a HEPA filter. In one region the OSH officer carrying out the audit raised seven improvements for the cleaners with HEPA filters to be purchased.

The use of disposable overalls was not common. From the responses provided it appeared that only 26% employed reasonable practices to prevent the spread of asbestos on clothing.

## **Respiratory protection**

The majority of floor sanders were found to have suitable respiratory protection available. From the observations made by some of the OSH officers carrying out the audit, it is not so obvious that these respirators would be well maintained and worn consistently.

## **Disposal of waste**

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Thirty-six percent of the contractors that responded to this question indicated that they placed the dust in a plastic bag and sealed it. Two contractors specifically stated that they used double bagging. Fifteen percent said they disposed of sanding dust direct in a bin or skip.

# **Discussion**

While the audit results provide a broad picture of the work practices, the figures presented in the analysis should be viewed with some caution. It was not always obvious whether or not a particular contractor did, in fact, sand floors that contained asbestos residues, making it difficult to know the relevance of questions relating to the precautions taken to minimise the asbestos risk.

One point is clear – the removal of vinyl asbestos flooring continues to be poorly managed. While you could take the approach that it is entirely up to the contractor to find out about and apply the required controls, the inconsistencies around the country also reflect on OSH's inability to get the message to those involved. Flooring contractors have also pointed out that when OSH provides direction, it is not always compatible with the asbestos Regulations and guidelines.

A number of other issues raised by those in the industry suggest that the current guidelines need to be reviewed. In some places the recommended procedures need to be clearer and other steps need to be introduced to ensure that the risk presented by working on vinyl asbestos flooring is minimised. The number of cases that OSH has taken or is considering taking court action over highlights the lack of understanding by contractors.

Looking at some specific aspects of the survey:

## **Identification**

The indication that 17% of contractors either directly or indirectly use laboratory testing to confirm the identification of asbestos seems particularly high, and is somewhat inconsistent with the information from the laboratory that carries out the majority of asbestos analysis. While they do receive a considerable number of vinyl samples for testing (in excess of 200 in the last 12 months), relatively few contractors submit samples. The laboratory also commented that it is location dependent, with the flooring contractors in a few towns accounting for the majority of the samples. The bulk of the samples they receive are from the public direct or Crown Public Health officers.

While some contractors seemed very confident about their ability to identify products that contain asbestos by looks and age, there have been a number of cases that have come to OSH's attention where the contractor has either got it wrong or chosen to disregard the fact that the flooring may contain asbestos. The view that the asbestos in vinyls is "safe" has also been expressed. While it is true that the majority of asbestos encountered in flooring is chrysotile (white asbestos), and it may not be as potent as the blue and brown forms, it has the same potential to cause asbestosis and lung cancer.

## **Floor preparation**

In some cases, covering the existing flooring with a composite board is a viable option. A number of contractors also pointed out that they prefer to scrape off the bulk of the flooring and apply a levelling compound to prepare the surface. These techniques are not always applicable, however, such as where a polished wooden floor is required, or the floor level has to match an adjoining surface.

While it is reasonable to accept that some flooring contractors will not sand or work on a floor when they know or suspect that asbestos could be involved, anecdotal evidence suggests that the sanding is perhaps more common than conveyed by the figures produced by this audit. Eight percent indicated that they would not even look at the job if it involved a product that may contain asbestos. Of the remaining group, 38% suggested that they would refer the work to a “specialist” once it was established that the flooring involved did contain asbestos. “Off-the-record comments”, made by contractors who talked more openly about industry practices, pointed to a competitive industry with considerable pressure to accept work that was on offer.

## **Compliance with the HSE Act and Regulations**

Apart from protecting themselves, to comply with the legislation two outcomes have to be achieved by contractors working on floor coverings that may contain asbestos:

1. Airborne asbestos fibre must be prevented from entering areas that may be occupied.
2. Asbestos waste, including asbestos-containing dust, must be prevented from contaminating the building or any other area.

The current guidelines for working on vinyl asbestos flooring coverings were designed to provide practical advice on achieving these objectives. In hindsight, it appears that the information does not clearly define what is required. This point was conveyed to OSH by the President of the New Zealand Floor Coverings Association. He also expressed concerns that OSH staff around the country had provided his members with differing versions of what steps need to be taken to achieve compliance.

From correlating the findings of the audit, comments made by the flooring contractors and the direction provided in the OSH guidelines (see appendix), it becomes apparent that there is room for confusion. Although the procedures outlined in the guidelines are reasonably specific, the overall objective of complete containment of asbestos is not spelt out.

One point that does not seem to be recognised by the contractors is the fact that respirable asbestos fibres that cause disease are extremely small, invisible to the naked eye and stay suspended in the air for hours after being released. There seems to be a tendency to relate the sanding dust itself with the risk to health. The coarser dust is a problem, but for a different reason. Dust with asbestos in it that is spread throughout the building is a potential source of respirable asbestos fibre when the dust is later disturbed. Contamination of carpets and soft furnishings is a particular problem.

The current guidelines require the work area to be isolated from other parts of the building, but there is no specific mention of ventilation. When friable asbestos is being removed, the standard procedure is to provide extraction ventilation to establish a negative pressure inside the work area. It would seem reasonable to require adequate ventilation in areas where vinyl asbestos flooring is being removed, and in some instances this would mean that an extraction system would have to be used.

There are also practical steps to minimise the spread of asbestos that are not in the guidelines, but were raised by the contractors during the audit. For example, when the backing of a vinyl is exposed, it should be wetted before it is removed. Also, care needs to be taken to prevent the spread of asbestos to the rest of the building from walking through areas where the backing is exposed.

The dangers of using a flammable hydrocarbon like kerosene to wet floors prior to sanding has been raised with OSH. There are high flashpoint hydrocarbons available from some petrochemical supplies that are suitable for the job, but some contractors have been unable to access these.

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# **Recommendations**

It is recommended that the OSH bulletin *Guide to Work on Vinyl Asbestos Floor Coverings* be revised with the inclusion of more specific detail on the steps that can be taken to prevent the spread of asbestos contamination. This material could at a later date be incorporated into the OSH *Guidelines for the Management and Removal of Asbestos*.

The revised guide should then be promoted within the flooring industry along with a clear indication that OSH will take action if contractors fail to achieve compliance with the asbestos regulations. This could be achieved by arranging regional workshops with flooring contractors and retailers.

Suggested changes to the guide include addressing the following:

1. The procedure of applying a levelling compound in place of sanding is not mentioned in the current guidelines.
2. While isolating the area is a requirement in the current guidelines, the contractors clearly have not taken this seriously. The steps to be taken need to be spelt out in more detail.
3. Sanding machines contaminated with asbestos are taken from job to job.
4. Vacuum cleaners are not always fitted with HEPA filters.
5. What can and can't be done without an asbestos certificate of competence is poorly interpreted, both internally and within the industry.
6. What constitutes asbestos residues is not clear. There are examples where a contractor has considered that all the flooring was removed, but sanding resulted in widespread asbestos contamination. It has to be stressed that a relatively small mass of vinyl residue may lead to a significant level of airborne asbestos fibre.
7. Ventilation of the work area is not covered in the current guidelines.
8. Dry sanding is still being carried out. While the guidelines point out that this is restricted work, the consequences of dry sanding need to be covered in more detail.
9. The use of kerosene in wet sanding floors should be further investigated (in particular the availability of high flash point products).

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# **Appendix: Advice Contained in OSH Guidelines for Controlling the Hazards in Working With Vinyl Asbestos Floor Coverings**

Procedures for dealing with vinyls that may contain asbestos are set out in the *Guidelines for the Management and Removal of Asbestos* and the bulletin *Guide to Work on Vinyl Asbestos Floor Coverings*.

The guidelines stress that dry sanding is restricted work and can only be carried out by a person holding a certificate of competence. Complete isolation of the work area and extraction ventilation is expected when the restricted work is being carried out.

The procedures to be followed when wet sanding a floor are:

- The work area should be sealed or isolated from other parts of the building. Normally this would involve using plastic sheeting or other suitable material to seal off all doors and entranceways.
- Cupboards and drawers should either be sealed or emptied before beginning the work.
- The floors should be wetted by mopping with kerosene or water to help suppress dust.
- All operators should wear “single-use” overalls which must be treated as asbestos waste on completion of the job. Overalls may be used for several jobs, but they must be sealed in a plastic bag between jobs.
- All operators should wear a half-facepiece respirator with a class P1 filter suitable for asbestos dust, or a combination P1 organic vapour filter if kerosene is being used.
- Clean-up procedures should be carried out thoroughly by first vacuuming residues and dust from all surfaces, followed by wet mopping. The vacuum cleaner should be fitted with a HEPA filter and the cleanings disposed of as asbestos waste.
- Where wet sanding has been carried out in service rooms such as kitchens, cupboards and drawers not previously sealed should be vacuumed and wiped down with wetted rags.
- All asbestos-contaminated waste (including rags used for wet wiping) must be disposed of in properly labelled and sealed bags. Equipment used to sand floors should be cleaned by vacuuming and wet wiping before being removed from the job.

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