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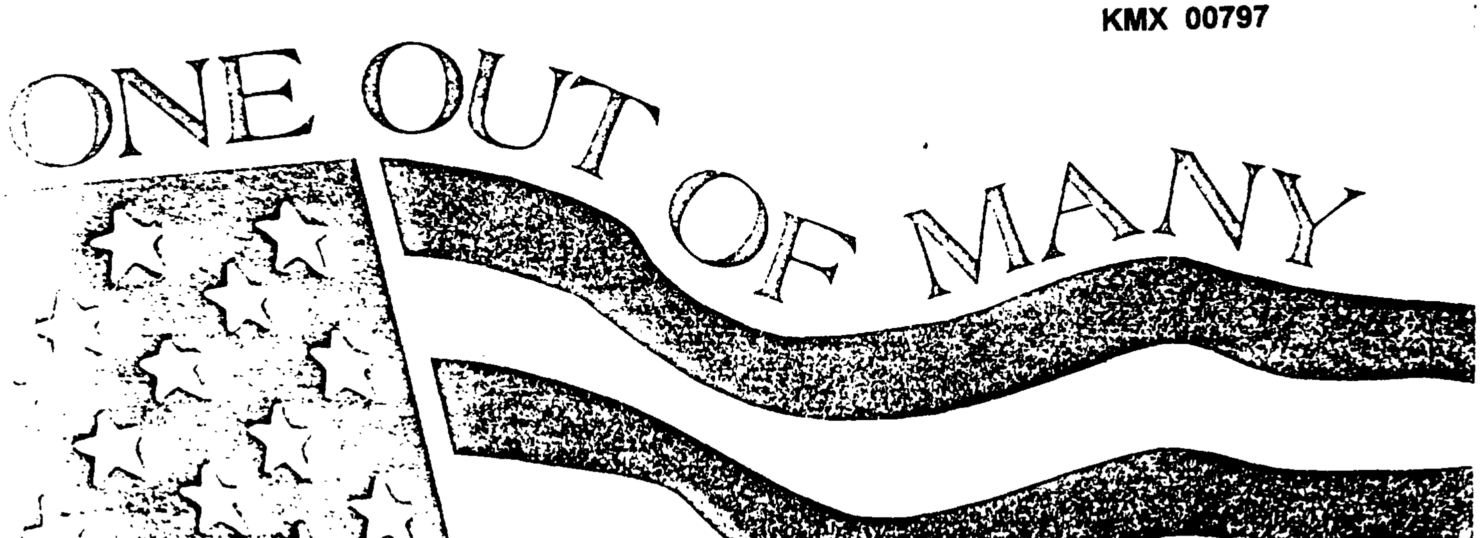

ASBESTOS AND SILICA DUST
in the Drywall Industry. Business-Health-Life Part 2

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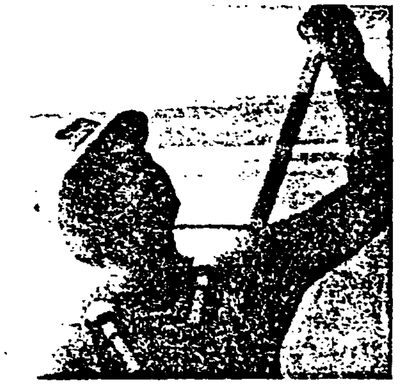
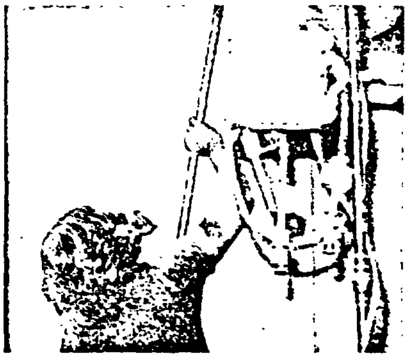
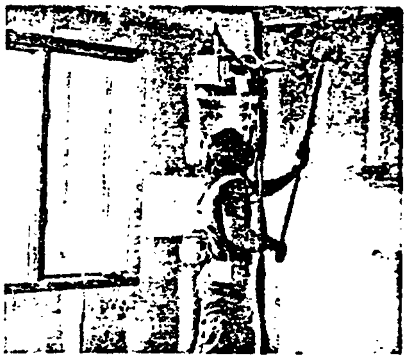






Introduction

In the last issue of the GDCI Drywall Magazine, the current status of the OSHA regulations for asbestos and for crystalline silica was described. This article completes the picture with field data on asbestos and silica exposure under normal operating conditions obtained at eight job sites in four states. Sanding, wet-out of dry-mix materials, and cleanup were examined. Work procedures at the jobs tested are described so that the results can be related to similar operations in other locations.

Abstract

The highest airborne asbestos concentration found during sanding was 3.5 fibers/cc longer than 5 micrometers. This is well below the allowable OSHA ceiling limit of 10 fibers/cc. The corresponding 8-hour, time-weighted average exposures ranged from 0.2 to 0.9 fibers/cc. These levels are also well below the 5 fiber/cc limit now allowed and the 2 fiber/cc limit scheduled to go into effect in mid 1976.

Asbestos exposure during the wet-out of dry-mix materials ranged from 2.7 to 62 fibers/cc. It appears to be possible to hold the concentration to acceptable levels by careful handling of the bags but it is probably desirable to wear an approved respirator during this operation.

The concentrations of respirable dust generated by three different dry sanding procedures varied by a factor of ten. The contractor has a great deal of control over dust levels on the job by his choice of work practices.

Exposure to airborne quartz was checked at five job sites and three were found to be near or above the Action Level proposed by NIOSH. The observed levels depended directly on the quartz content of the mud and on the severity of the sanding operation. Much higher levels are possible under adverse combinations of these two factors.

The Choice for the Drywall Industry

The information presented here provides an excellent illustration of a broader question that is facing industry today, i.e., what is the best way to comply with the various occupational safety, consumer safety, and environmental protection regulations that are being promulgated? These safety and health regulations are an established trend of the times and appear to be here to stay. By their very nature, these regulations generally increase the cost of each product and service involved. Although these costs will ultimately be borne by the final user, it benefits everyone to achieve the appropriate level of safety and health in the most efficient way possible and thus minimize the incremental cost for these important items.

When a new regulation is promulgated covering a particular material, the natural reaction is to put the entire burden on the supplier and demand that he replace

KMX 00798

the regulated ingredient. In the case of asbestos, which imparts very valuable performance characteristics to the tape joint compounds, the replacement is proving to be difficult. The asbestos-free muds so far available are more expensive. Also, they often do not trowel as well which adds to the cost of installation. Additional reformulation to reduce the quartz level could result in further loss in properties and increases in cost.

It will be shown that the dust levels related to drywall finishing vary widely depending on how the contractor operates. This suggests that it may be to the contractor's advantage to make reasonable adjustments in operating procedures to use existing products in compliance with regulations rather than demanding that the suppliers provide products that are completely safe under the most adverse job-site conditions but are more expensive and do not perform as well.

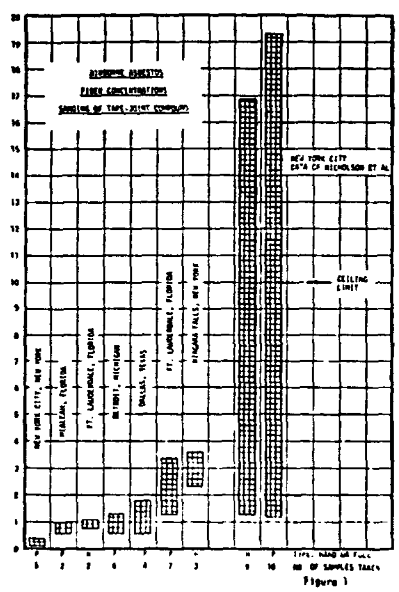
Collection of Dust Samples

The photographs on the cover of the November-December issue of Drywall Magazine showed how the air samples were collected. Both personal samples and high-volume area samples were obtained. For personal samples, a small battery-driven vacuum pump was hooked to the operator's belt. A cartridge containing a filter paper about one and one-half inches in diameter was attached to the operator's shirt pocket and connected to the pump with plastic tubing. As the man went about his job in the normal manner, air from his breathing zone was drawn through the filter paper by the vacuum pump so that the dust present in the air sample was deposited on the filter paper.

The high-volume samplers operated the same way but were larger and pulled about five times as much air. They were mounted on poles adjacent to the sanding and were moved at regular intervals to stay close to the operator.

There was one important difference in the samples collected for silica analysis. The proposed regulations refer to the "respirable fraction" of the total dust. This fraction is made up of the smaller, lighter particles in the total dust which are considered most likely to be carried into the lungs during breathing. A small cyclone separator was used ahead of the filter for these samples to remove the heavier dust particles and leave only the respirable dust.

For the asbestos measurements, the filter paper was examined under a microscope and the number of fibers longer than 5 micrometers (μm) was counted. For silica, the total quantity of sample collected was weighed and the percent quartz was found by X-ray diffraction. All procedures used were in accordance with OSHA regulations for asbestos or NIOSH recommendations for crystalline silica.[1]



Airborne Asbestos Exposure in Drywall Finishing

Sanding of Finished Joints: Airborne asbestos fiber concentrations during routine sanding operations were measured at six locations in four states. The results are shown in Figure 1 together with the data reported by Nicholson et al[2]. The range of fiber concentration measured at each location is given by the cross-hatched bars. The type of sanding, hand or pole, and the total number of personal samples taken at each job location are shown at the bottom of the Figure.

It is immediately evident that the samples collected in this survey are much lower than those reported by Nicholson. When this gross difference became evident, two filters each from three different locations were sent to independent laboratories for check counts. The results are compared with those of the Union Carbide laboratory in the following table:

Interlaboratory Comparison
Asbestos Fiber Counts

Sample Source	Airborne Asbestos Fiber Concentration (Fibers/cc longer than 5μm) By UCC	By Lab A	By Lab B
Location I (Filter #1)	0.4	0.3	0.2
Location I (Filter #2)	0.4	0.0	0.2
Location II (Filter #1)	1.5	1.0	1.6
Location II (Filter #2)	1.3	1.0	0.6
Location III (Filter #1)	0.6	0.0	0.9
Location III (Filter #2)	0.4	0.2	0.2

Although there is some variation, these are difficult samples to count and the agreement between laboratories is excellent. It is evident that the differences between this survey and that of Nicholson are not due to sample analysis. The sanding procedures used to generate seem to be the most likely cause. In any case, the Nicholson results do not appear to be typical of the concentrations encountered under most job-site working conditions.

[1] The authors wish to express their thanks to the NGC Environmental Laboratories, Gold Bond Building Products, Division of National Gypsum Company, Buffalo, New York, who provided the collection equipment and analyzed the silica samples.

[2] Paper presented by Dr. W. J. Nicholson at the Miami, Florida meeting of the American Industrial Hygiene Association Conference, May 12-17, 1974.

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The ceiling limit allowed under the present OSHA asbestos regulations is also indicated in Figure 1. This limit is the highest level to which a worker may be exposed at any time without protective equipment. It is evident that the asbestos concentration in the seven jobs checked in this survey were all well below the 10 fibers/cc limit.

The OSHA regulations also specify a maximum allowable time-weighted average exposure of 5 fibers/cc now and a reduced level of 2 fibers/cc in July 1976. The Time-Weighted Average (TWA) is a measure of the workers' average exposure during the entire 8-hour workday. This concept is particularly important to the tape joint industry where asbestos exposures generally occur only during a moderate portion of some working days. As an example of Time-Weighted Average, a man might sand for two hours at an exposure level of 4 fibers/cc and work at some other job for the rest of the shift at another location where there is no asbestos present so the exposure would be essentially zero. In this case, his Time-Weighted Average would be calculated as:

$$\text{TWA} = \frac{(4 \text{ fibers/cc}) \times (2 \text{ hours}) + (0 \text{ fibers/cc}) \times (6 \text{ hours})}{(2 \text{ hours}) + (6 \text{ hours})} =$$

$$\frac{(4) \times (2) + (0) \times (6)}{6+2} = \frac{8+0}{8} = 1 \text{ fiber/cc}$$

Time-Weighted Average exposures have been estimated in the manner shown above for the seven job operations in Figure 1. The results are listed in the following table:

Summary of Airborne Asbestos Fiber Concentrations During Drywall Sanding

Location	Ceiling Exposure (Fibers/cc >5μm)	Exposure Time During Sanding (Hours)	Estimated 8-Hour TWA Exposure (Fibers/cc >5μm)
New York City, NY	0.4	6.0	0.3
[illegible]	1.0	4.0	0.4
Ft. Lauderdale, FL [illegible]	1.1	1.0	0.1
[illegible]	1.3	8.0	0.9
[illegible]	1.8	0.5	0.1
Ft. Lauderdale, FL [illegible]	3.4	1.5	0.6
[illegible]	3.6	[illegible]	[illegible]

The estimated TWA values range from 0.9 fiber/cc down to 0.1 fiber/cc. They are all well below the current 5 fiber limit and the July 1976 2 fiber/cc limit. While it is recognized that this is only a small sample from the hundreds of locations throughout the country where tape joints are sanded, the sanding procedures used were typical of most commercial situations. The results provide good evidence that the asbestos concentrations during sanding at most locations are generally below the allowable OSHA limits.

Wet-Out of Dry-Mix Materials: In some parts of the country, dry-mix tape joint compounds and texture sprays containing asbestos are widely used. When these are mixed into water at the job site, asbestos exposure can result. Spray texture paints may contain about the same level of chrysotile asbestos as tape joint compounds.

Asbestos exposure during the wet-out of wall and ceiling spray texture was measured at two locations. In Figure 2 the results are compared with those of Nicholson for the wet-out of tape joint compounds. Since these are short-term occasional exposures, the ceiling limit of 10 fibers/cc is most pertinent and is also shown on the Figure.

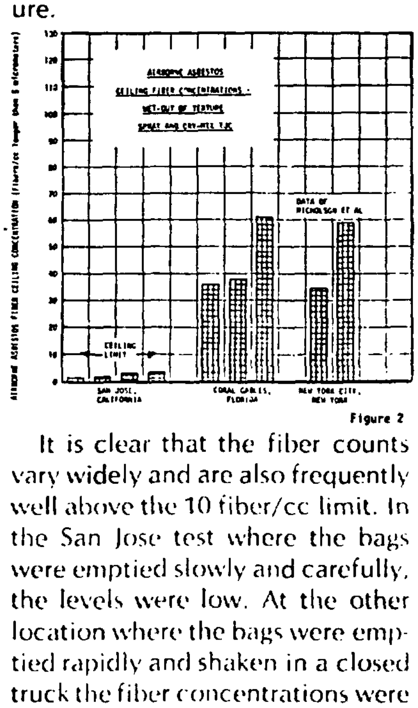

Figure 2

It is clear that the fiber counts vary widely and are also frequently well above the 10 fiber/cc limit. In the San Jose test where the bags were emptied slowly and carefully, the levels were low. At the other location where the bags were emptied rapidly and shaken in a closed truck the fiber concentrations were in the same range as the high levels reported by Nicholson. On the basis of this data, it is prudent to wear a respirator while wetting out dry-mix and the bags should also be handled with care.

Cleanup After Job Completion: Asbestos exposure may also occur during the cleanup after a drywall finishing job is completed. Limited data on this operation are shown in Figure 3, together with the results reported by Nicholson.

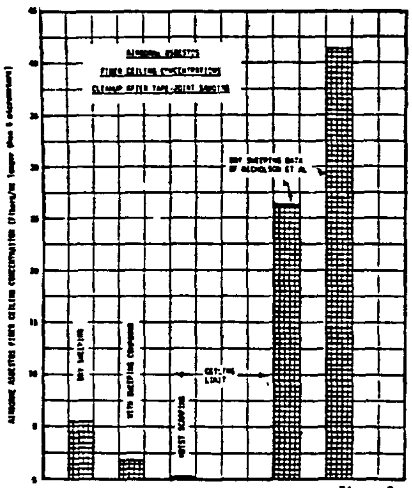

Figure 3

In the left-hand portion of the Figure are data obtained in a test at a Florida condominium. Both the walls and ceilings had been sanded lightly and then sprayed with texture paint. The texturing overspray had hardened on the floor. The normal cleanup procedure was to wet the floor lightly with water from a hand sprayer and then remove all excess material from the floor with a long-handled scraper. As might be expected, this damp operation gave a very low airborne fiber concentration of 0.3 fiber/cc.

In order to get a direct comparison with other cleanup methods, a number of apartments in the same building were swept with a stiff broom, both with and without the addition of ordinary sweeping compound. It was difficult to break loose the hardened overspray so the broom work was fairly vigorous. In spite of this, the highest level

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found was a ceiling concentration of 5.5 fibers/cc produced by the dry sweeping. Use of the sweeping compound reduced this to 1.8 fibers/cc.

These data illustrate that moist scraping, which is now in regular commercial use in some parts of the country, is a good cleanup method to control dust. These data do not mean there is no asbestos dust problem during cleanup since jobs where the walls have been sanded heavily present more potential for dust generation than the light sanding case tested. This point is emphasized by the data of Nicholson in Figure 3 which gave levels of 26 and 43 fibers/cc during sweeping after heavy sanding. While it seems doubtful that levels this high would be encountered in most typical job cleanup situations, exposures above the ceiling limit appear quite possible. More information is needed to define better the levels to be expected under routine field conditions.

Airborne Respirable Dust Exposure in Drywall Sanding

It was noted in the first article that there is an OSHA standard which sets the maximum allowable exposure level to the respirable fraction of nuisance dust at 5 milligrams per cubic meter (mg/M^3) of air. In simplest terms, a nuisance dust is a dust which does not have the exposure level controlled by any of the other standards for specific materials. Even if a dust containing asbestos and/or crystalline silica is in compliance with the standards for these materials, it would still be in violation if the respirable dust level exceeds 5 mg/M^3.

The concentration of respirable dust during sanding was measured at five of the job sites in three states. These levels, expressed as milligrams of respirable dust per cubic meter of air, are shown in Figure 4. The crosshatched bars give the range of concentrations found at each job with the respective average concentrations shown by the dark line in the central portion of each bar. Sanding conditions for each site are also noted.

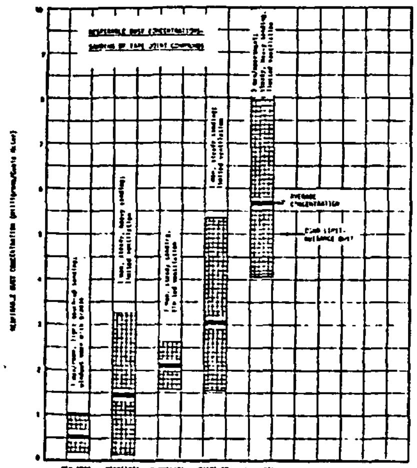

Figure 4

At the New York location, two courses of general-purpose, ready-mix mud had been applied with hand tools. The building was a high-rise apartment with the windows open and a light breeze blowing. A five-man crew of tapers was spot sanding lightly by hand or with a pole sander as needed and touching up with a finish coat of general-purpose, ready-mix. Usually only one man was working in each room. Respirable dust levels from personal samplers ranged from 0.2 to 1 milligram per cubic meter and averaged a very low 0.55 mg/M^3.

The Michigan test took place at a multilevel dwelling (approximately 2,300 square feet floor area) finished with a dry-mix topping compound. The windows were closed and there was no ventilation. A laborer, who normally spends most of his time sanding, went over the walls and ceiling in about four hours with a pole sander. Respirable dust ranged from 1.55 to 5.34 mg/M^3 and averaged 3.02 mg/M^3.

The tests at Minnesota Site 1 and Site 3 were quite similar to that in Michigan. Both were residential dwellings of 2500 and 1500 square feet, respectively, finished by hand tools with asbestos-free dry-mix topping compound and pole sanded in about four hours by a laborer who did this as a full-time job. The windows were in and there was little ventilation. At the smaller house, Site 3, only the walls were sanded. Respirable dust at Site 1 ranged from 0.15 to 3.23 mg/M^3 and averaged 1.45 mg/M^3. At Site 3 the range was narrower at 1.59 to 2.62 mg/M^3 but averaged about the same at 2.10 mg/M^3.

Minnesota Site 2 was a four-story apartment building with an asbestos-free dry-mix topping compound finished with hand tools. There was very limited ventilation while three men sanded together in each apartment unit until it was finished and then moved on to the next unit. Here the range fell in the much higher level of 4.06 to 7.95 mg/M^3 and the average was 5.76 mg/M^3. This was the only location where the respirable dust level consistently exceeded the OSHA limit.

These data show clearly that there can be a very wide, tenfold, difference in the average respirable dust levels for the different severities of sanding. Light, touch-up sanding with good ventilation gave about 0.5 mg/M^3. The three tests with one man sanding steadily with little ventilation ranged from 1.5 to 3 mg/M^3 and averaged 2.1 mg/M^3; about four times that for touch-up. Three men sanding together increased the average level to about 2.5 times that of one man sanding alone and 10 times that of touch-up. It is very clear that the dust level at the job site can be changed widely by the work practices employed.

Airborne Crystalline Silica (Quartz) Exposure in Drywall Sanding

The airborne quartz concentration in the dust generated during the sanding of tape joint compound was measured at five job sites in three states. The concentrations found, expressed in micrograms per cubic meter, are shown in Figure 5. A microgram (μg) is 1/1000 of a milligram so these levels are much lower than the respirable dust. The maximum allowable TWA and Action Level proposed by NIOSH, the quartz content of each mud, and the average level of respirable dust measured at each job location are also given.

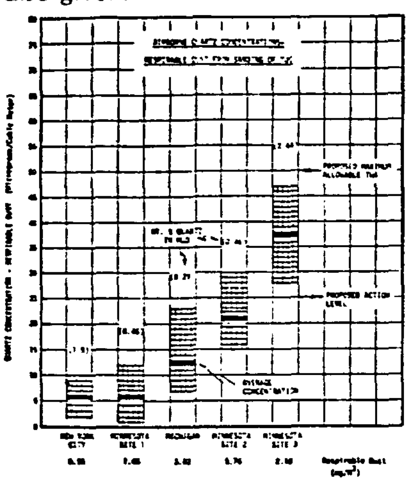
Figure 5

Two locations, Minnesota Sites 2 and 3, had quartz concentrations that were above the proposed action level, and a third, Michigan, approached this level. The other two jobs tested, New York and Minnesota Site 1 had very low quartz levels and were well below the Action Level. Three out of five of these job sites thus had concentrations high enough so that regular monitoring would probably be required under the proposed regulations.

The results for Minnesota Site 2 are of particular significance. Here three men sanded together in each apartment and generated the highest observed respirable dust level of 5.66 mg/M³ but the quartz level was not the highest found by a considerable margin. The mud being sanded had a low quartz content so the dust generated also contained less quartz.

This point is shown more specifically by a direct comparison of the New York and Minnesota Site 2 results. The mud used in New York contained about three times as much quartz as that used in Minnesota. The sanding was lighter in New York, however, and only about one third as much dust was generated. These opposing factors balanced out to give the same quartz level at both locations. A mud with a high-quartz level, sanded lightly, can thus give the same airborne quartz concentration as a low-quartz mud sanded heavily.

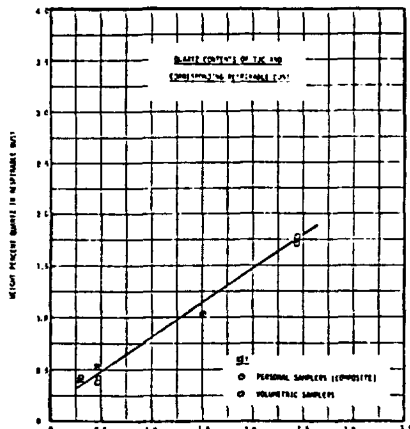
Figure 6

The broader applicability of this principle is illustrated in Figure 6 which compares the concentration of quartz in the respirable dust with the concentration of quartz in the mud being sanded. Over the range of mud concentrations tested, these two concentrations are approximately equal. On this basis, a mud containing 2.5% quartz sanded at the most severe conditions like Minnesota Site 2 could give a quartz concentration around 100μg/M³, far above the allowable level.

It was shown in the first article that the eleven commercial muds tested had quartz levels ranging from 0.3 to 2.5%. The tape joint industry thus appears to be facing a range of conditions. Light sanding of low, and even medium, silica muds should give quartz concentrations well below the proposed Action Level. Heavy sanding of high-quartz muds is likely to give concentrations well over the allowable limit. The whole range of quartz concentration in between is possible depending on the kind of mud used and the sanding procedures followed.

Summary and Conclusions

The exposure to airborne asbestos during the sanding of tape joint compound was measured under routine working conditions at seven job sites in four states. A wide variety of sanding conditions was tested. Exposure to respirable dust and crystalline silica (quartz) was also measured at most of these sites.

The airborne asbestos ceiling concentration found at each of the sites ranged from 0.4 to 3.6 fibers/cc longer than 5 micrometers compared with an allowable level of 10 fibers/cc longer than 5 micrometers. Time-Weighted Average exposures were also calculated for each job and were found to vary from 0.2 to 0.9 fibers/cc longer than 5 micrometers. These levels are well below both the OSHA limit of 5 fibers/cc now allowed and the 2 fibers/cc level scheduled to go into effect in mid 1976.

Asbestos exposure during the wet-out of dry-mix tape joint compounds and spray-texture paint was examined. Ceiling exposures for this short-duration operation ranged from 2.7 to 62 fibers/cc longer than 5 micrometers. It is possible to keep the concentrations at acceptable levels by careful handling of the bags, but it is probably desirable and may be necessary to wear an approved respirator during this operation. The substitution of ready-mix is also an obvious possibility.

Cleanup procedures after completion of drywall operations were tested briefly. Both high and low asbestos dust levels appear to be possible, depending on the amount and type of sanding done and the type of sweeping. A very effective wet-spray and scraping cleanup method now in general use in some

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ASBESTOS AND SILICA DUST

OSHA Regulations and Exposure in Drywall Operations

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Introduction

This two-part article is intended to acquaint drywall contractors with the current and proposed regulations governing the use of products containing asbestos and crystalline silica.

The concluding article in the next issue will present data on the exposure to airborne asbestos and crystalline silica (quartz) during the sanding of tape joint compound. A total of seven industrial locations were tested. Exposures to asbestos during the wet-out of dry-mix compounds and during cleanup will also be shown.

BACKGROUND AND CURRENT STATUS— OSHA ASBESTOS REGULATIONS

The Williams-Steiger Occupational Safety and Health Act was passed in 1970 with the stated objective of assuring, insofar as feasible, every American worker a safe and healthy workplace. Under the provisions of this act, the Secretary of Labor issued an emergency temporary standard for exposure to asbestos dust on December 7, 1971. After extensive public hearings, a permanent standard, effective July 7, 1972, was promulgated.

The asbestos standard and the methods used by OSHA to develop it were immediately subjected to a massive legal attack by the Industrial Union Department, AFL-CIO. In addition to the law suit, OSHA was under continued pressure from other labor groups, public interest groups, and spurred on by the news media to make revisions. It was also recognized that this was the first health standard written. As such, there were parts that were vague, parts that were impractical to enforce, and parts that were overly restrictive without a corresponding benefit in protection for the worker.

During 1973, OSHA decided that the asbestos standard should be altered. The initial concept was to replace it with a series of mandatory work practices that would minimize the admittedly cumbersome monitoring requirements. The asbestos industry was asked to submit proposed work practices and a technical committee was formed under the auspices of the Asbestos Information Association/ North America. This committee consisted of representatives from about a dozen asbestos producers and large manufacturers of asbestos-containing products. Communication was also maintained with trade associations that used asbestos or its products. A draft work practice for joint taping was drawn up and submitted to the GDCI for comment.

The technical committee drafted several broad work practices relating to the handling of asbestos. It soon became evident that a large number of specific work practices would be needed to cover the wide range of industrial situations where asbestos or asbestos-containing products were used. The committee also examined and recommended changes in the portions of the regulations that were vague or overly restrictive.

The IUD decision was announced in mid 1974 by the United States Court of Appeals for the District of Columbia. The court generally upheld the OSHA position in the matter and noted that, although the Congress had poorly defined the procedures to be used to set such standards, OSHA had used proper methods to collect and evaluate the conflicting evidence presented. The judgments made to arrive at the standard were within the discretion granted to OSHA; and, more particularly, the court said that it was correct and proper to consider economic factors. Two points were remanded for further consideration; those relating to record retention and the time allowed for compliance.

After the court decision, OSHA materially altered their position on the revision of the asbestos regulations. Under heavy pressure to issue health regulations for other substances, a decision was made to amend the asbestos regulations only to the extent needed to clarify ambiguities. No changes were to be proposed in the allowable exposure levels. Many of the suggestions for clarifying language made by the AIA/NA Technical Committee were understood to have been accepted.

The redrafting of the regulation along these lines was apparently completed in late 1974 and the results were submitted for review to various governmental departments as required by law and policy. During 1975 key personnel changes occurred at policy making levels in both OSHA and NIOSH. At some point, apparently quite recently, the decision was made to drop the amendment concept and reopen the entire asbestos and health controversy. This information became

KMX 00803

public when the proposed changes were published in the Federal Register on October 9, 1975.

The asbestos standard that was promulgated on June 7, 1972 and which is still in effect can be divided into seven main categories:

1. Sets the maximum allowable airborne asbestos concentrations in the workplace at a ceiling level of 10 fibers/cc longer than 5 micrometers and at a time-weighted average (TWA) for an 8-hour shift of 5 fibers/cc longer than 5 micrometers. The TWA drops to 2 fibers/cc longer than 5 micrometers in July 1976.
2. Defines the acceptable procedures to meet these standards.
3. Defines where personal protective equipment may be used and specifies the types available.
4. Specifies monitoring requirements and the procedures to be used.
5. Specifies requirements for caution signs, caution labels, and housekeeping procedures.
6. Requires medical examinations for all employees "exposed to asbestos."
7. Sets requirements for keeping of medical and monitoring records.

The standard was written in language that fits conventional fixed manufacturing locations. It presents some very real problems, however, when applied to the construction industry where the job site and the work force are transient. The areas of particular difficulty to drywall contractors are those dealing with monitoring and medical examinations. The AIA/NA Technical Committee recommended a cutoff level below which medical examinations were not required. It was also proposed that monitoring could be dropped where monitoring experience had demonstrated the levels to be consistently below the cutoff or where the asbestos had been properly modified by a bonding agent to prevent excessive dust.

The revised standard proposed on October 9, 1975 follows the same general pattern but differs in the following critical points:

1. The allowable exposure level is reduced to 5 fibers/cc longer than 5 micrometers ceiling and *0.5 fiber/cc* longer than 5 micrometers time-weighted average (TWA).
2. Monitoring and record keeping requirements are increased substantially although a provision to discontinue monitoring under certain circumstances is included.
3. There is no cutoff level on the medical examination requirement.

OSHA has reviewed the recent medical literature on asbestos and has proposed regulations based on a very strict interpretation thereof. They have not assessed the economic (inflationary) impact of the proposed regulations but have stated their intention to do so or certify that there is no impact before public hearings are started. The burden of proof has been placed on industry to demonstrate that these regulations are overly restrictive. There is no question that if they are promulgated as proposed, they will place a very heavy burden on asbestos producers and users. Appropriate responses will be submitted by various segments of the asbestos industry and other interested parties.

OSHA has stated in the Federal Register that the construction industry will *not* be covered by the newly proposed regulations. They will continue to operate under the present regulations until a new vertical standard for that industry is developed. This should not lead to a false sense of security, however, because the same medical conclusions on allowable exposure levels are applicable regardless of the industry where they occur. Also, the OSHA health regulations are rapidly moving towards a fixed format that will embody all of the same basic concepts regardless of the substance being regulated. It should be noted that the development of an asbestos standard for the construction industry is in progress and recommendations have been submitted to OSHA by the Advisory Committee for the Construction Industry.

PROPOSED OSHA REGULATIONS — CRYSTALLINE SILICA

Asbestos products do not constitute the only potential health hazard for the drywall industry. Tape joint muds contain crystalline silica which has long been recognized as the cause of a disabling lung disease called silicosis. The National Institute for Occupational Safety and Health (NIOSH) has prepared a Criteria Document relating to occupational exposure to crystalline silica and submitted it to OSHA on November 11, 1974. A proposed silica regulation has been drafted by OSHA and was to have been published during September 1975. The pressure on OSHA to prepare other regulations has delayed this publication but it will undoubtedly appear in a few months.

NIOSH recommended an allowable maximum exposure level to airborne crystalline silica of 50 micrograms per cubic meter of air ($50 \mu g/M^3$). Medical examinations, extensive monitoring, record keeping, signs, warning labels, and other provisions similar to the asbestos regulations were also recommended. An action level of one half the allowable exposure limit was also defined as a cutoff point below which the regulations would not apply.

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OSHA REGULATIONS— INERT OR NUISANCE DUST

Table G-3 of Section 1910.93 of the OSHA regulations as revised on June 7, 1972 lists the maximum allowable airborne concentrations of inert or nuisance dust as 5 milligrams/cubic meter (mg/M^3) in the respirable fraction and 15 mg/M^3 in the total dust. If a dust is below the allowable levels for asbestos and silica but above that for nuisance dust, the regulations have been violated. This regulation has been less widely publicized than those for asbestos and silica but has been in effect for a number of years. It must also be considered when job-site dust conditions are examined.

COMPOSITION OF TAPE JOINT COMPOUNDS

Tape joint mud, either dry in bags or already mixed in five-gallon containers, is a well-known material at the job site. Few applicators realize, however, what goes into a mud and how carefully the ingredients must be balanced to give the critical blend of properties necessary to make the mud work properly during application and after it has dried.

The ingredients in a typical ready-mix tape joint compound are listed below:

COMPOSITION OF TYPICAL READY-MIX TJC

Ingredient	Percent by Weight Wet Basis	Percent by Weight Dry Basis
Water	31	—
Limestone	41	60
Mica (and Clay)	16	23
Binder	7	10
Asbestos	3	4
Miscellaneous	2	3
	100	100

Looking at the dry basis, which represents the condition when the mud is cured, it can be seen that the principle ingredient is limestone. This is the bulk filler that keeps the cost of the product down. It does not impart any handling properties to the wet mud.

The next largest ingredient is finely-ground mica which is in the form of tiny flat plates. These tend to form a loose structure in the wet mud and have an important bearing on how the mud flows when trowelled and how it shrinks when it dries.

The other mineral ingredient is asbestos. It is present at a level of 3-5% and performs the function of controlling shrinkage and cracking when the mud dries. It is also very important to trowelling properties which allow the mud to form easily in thick sections and permits feathering of the wet edge. The most critical function of asbestos in most muds is to provide freeze-thaw stability. Muds which do not contain asbestos will generally be unusable after they have been frozen.

The binder in ready-mix is usually vinyl acetate, while casein, starch, or a similar "glue" is used in the dry mixes. It cures to hold the compound rigid and firmly attached to the wall.

The miscellaneous ingredients include such items as additives, fungicides, surfactants, cellulosic thickeners, and proprietary materials. These are important ingredients but will not overcome the effects of an improperly balanced blend of major components.

A compounder who wishes to formulate a mud without asbestos will have to replace it with a material that will impart similar properties. The mica can be increased or some other fiber-like material, such as certain clays, may also be used. Additional cellulosic thickener to give the necessary viscosity is also likely to be required. This has a tendency to make the viscosity unstable, i.e., correct at the plant when manufactured but either too high or too low when the mud arrives at the job site.

The reformulation problem becomes much more complicated when silica is considered. Four different limestones commonly used in the manufacture of TJC have been analyzed for crystalline silica content and found to range from 0.3 to 2%. Similarly, three different micas had silica contents of 2, 5, and 9%. While asbestos is usually free of crystalline silica, clays often contain substantial quantities.

By proper selection of ingredients, it is possible to produce a mud with a silica content as low as 0.3%. Unless the low silica ingredients are readily available mud costs will increase. Since silica appears everywhere in nature, it is unlikely that a tape joint mud can be prepared without detectable levels. If the proposed regulations are promulgated, workplace monitoring can be extensive and a considerable financial burden can be imposed on contractors.

Eleven commercially available muds were found to contain from 0.3 to 2.5% of crystalline silica which is consistent with the silica content of the raw materials. Very few mud suppliers appear to be aware of the potential silica problem.

It is well known that the major tape-joint compounders have had extensive research programs underway for the past several years to develop asbestos-free muds that work as well as those with asbestos. So far, the programs have had limited success. The muds developed are more expensive and generally do not perform as well. The formulations now in use evolved to their present high-performance level over many years and it is, obviously, difficult to replace the key functional ingredient.

(Continued on page 30)

KMX 00805

(*Continued from page* 3)

associations and other special interest groups do it...so, why can't we do it?

Much has been said about involvement and participation. However, we cannot too often repeat that, if we are to solve the problems facing us in these turbulent times, we must all work together to understand the nature of our age and the world in which we live. Many of the problems affecting our Industry today stem from very basic roots. We have created a society founded on science and technology, yet have not found a meaningful place for many of the younger generation nor successfully employed the abilities of a large part of the older generation. We are in a crisis over values and aims of our culture; our efforts have been centered on materialism and striving for world leadership, rather than concentrating on values and the full development of human resources in our homes and in our own communities. As surely as day follows night, it is an inescapable fact that we are all affected by the events of our times. There is no longer a place to run and hide, and we cannot afford to accept complacency or trust in the security of our own backyards. We must take responsibility for more than our own concerns so that each person may have the opportunity to develop his own potential for good and thereby strengthen the entire nation. We must, in short, be motivated toward involvement.

You ask what GDCI will do for you? It will do what you ask of it and demand of it, for you as a member do indeed have a voice. The association has now been in existence some 20 years and is recognized as the spokesman of the Drywall Industry, both by government and those within the Industry. So let's all get involved... let's not be like a shot from a 16 ga. shotgun, but let's be a cannon ball, moving through the halls of Congress and showing that our Industry is a unified group from one end of the nation to the other and spanning the seas. For, if you don't get involved, the new laws and regulations, the growing lack of concern for quality, the steadily decreasing productivity rate and the escalating prices will eventually put your Industry—and you—out of the market. And sooner than you may think, one morning you will awake to find another product in its stead. Not reasonable, you say?

Then, isn't it reasonable that you, who have made a living from this great Industry, should contribute to the well-being of that Industry and stand shoulder-to-shoulder with confidence, 6,000-strong across the nation and throughout the world, to assure that the Drywall Industry does endure and will continue to make this world a better place in which to live, work and play?

Howard R. Leederman
Editor

(*Continued from page* 8)

ASBESTOS EXPOSURE IN THE TAPE JOINT INDUSTRY

The tape joint industry had their attention drawn forcibly to the asbestos standard in the Spring of 1974. A group at Mt. Sinai Hospital, led by Dr. Selikoff, announced the results of a study of 59 tapers who were members of Local Union 1974, Drywall Tapers and Pointers of Greater New York. The fiber counts found during sanding were generally very high and one longtime worker in the industry had a clearly recognizable case of lung fibrosis. The same data were transmitted to NIOSH who issued an alert to the industry.

At the time of this publicity, a major supplier of asbestos and other products to tape joint compound manufacturers had collected dust count samples during sanding at two locations in Florida. In contrast to the New York City results, the fiber levels found were low and well within the regulations. A possible reason for the difference can be found in the application and sanding conditions, i.e., hand-tool applied and heavily sanded in New York City compared with Ames tools and light sanding in Florida.

The question of different work practices was pursued further with various contractors. It was found that the amount of sanding done varied widely, even within a geographical area. It depended on the way the mud was applied, i.e., Ames vs. hand tools, the skill of the operator running the mud, the type of finishing coat to be applied to the wall, the size and quality of the job, i.e., custom or "mass production," the amount of ventilation, and the personal preference of the contractor. In addition to these mechanical factors, different mud formulations appeared to vary widely in their tendency to generate dust when sanded. In general sanding was minimized to reduce costs.

It was obvious that more information from other parts of the country was needed to better define the levels of asbestos exposure to be expected. With the assistance of the GDCI and the excellent cooperation of various individual contractors, field tests have now been run in New York, Texas, Michigan, and Minnesota. The New York, Michigan, and Minnesota sites were carefully selected to cover as wide a range as possible in the "intensity" of the sanding operation. Conditions varied from one man sanding lightly to three men sanding heavily in the same apartment. The New York tests also provide information on hand tool application. In addition to asbestos tests, air samples were collected at several of the locations to check the airborne concentration of crystalline silica (quartz) in the respirable fraction of the dust. The results of these tests will be presented in the January-February Issue.