ASSESSMENT OF EXPOSURE POTENTIAL

from

ASBESTOS-CONTAINING MATERIALS

* * * * *

- Essential Assessment Factors
- How to Document Assessments
- EPA's Recommended Algorithm
- A Corrective Action Scale
- A Format for Assessment Reports

This handout has been prepared as an informal training aid by the Regional Asbestos Coordinator, Environmental Protection Agency, Region IV, Atlanta, Georgia 30365 (404) 881-3864

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AN EXPOSURE ASSESSMENT GUIDE

An Exposure Algorithm with Assessment Descriptors*

"Exposure assessment" is a process to be undertaken once asbestos-containing materials have been found in a building. The process is undertaken by building owners and managers, normally with the assistance of architects and engineers, to consider corrective or control measures. Control measures are normally considered on the basis of "sampling areas" wherein analytical results have confirmed the presence of asbestos. See Table I.

The assessment process is begun by using an exposure algorithm. An algorithm is a guide for comparative decision-making. Those factors to be considered in assessing potential exposure to respirable asbestos fibers are given a scale or range of values. The selection of a scale number - the one most applicable to a given situation - is made by using factor descriptors. See Table II.

Judgment is required in selecting the most applicable descriptor scale numbers. Consistency in judgment is essential, in that this algorithm is a highly subjective one. By using the same algorithm format, different buildings, and different rooms within a building, can be compared and prioritized according to greatest exposure potential. Extensive use of photography should accompany the assessment process, to develop a visual record of the factors under judgment.

The degree of exposure potential can indicate varying requirements for abatement and control measures to be taken at the building owner's expense. The exposure potential is indicated by the statistical results of the algorithm. Suggested abatement and control measures are equated to the range of results available. See Table III.

*See 34 CFR Parts 230 and 231
Also 40 CFR Part 763

ESSENTIAL ELEMENTS OF INFORMATION

- ASSESSMENT FACTORS -

The vital elements of concern when conducting an assessment of asbestos exposure potential are outlined below. These elements and their relationship within an algorithm were defined by Dr. Robert Sawyer, a medical doctor teaching at Yale University. Dr. Sawyer has put an extensive amount of time into development of this algorithm. Its value will become more evident to the assessor when a large number of buildings with suspect material have been evaluated.

Only through the experience of looking at and touching a large number of suspect materials with variations in their several factors can one develop confidence in use of this algorithm. The friability factor is the most difficult one to appreciate.

Become aware of the fact that neither asbestos content nor friability, in and of themselves, constitutes an exposure problem. Time must pass, wherein the several operational factors listed below can bring about a respirable asbestos fiber problem.

The qualitative factors described below have a far greater impact on the results of the algorithm calculations. Figure 1 displays the numerical method, showing a certain set of weights or values for each of the eight assessment factors.

OPERATIONAL FACTORS

CONDITION OF MATERIAL

Material condition may indicate the possibility of contamination (i.e., fibers released to the area) and the potential of future contamination. It is a combination of the quality of the installation, adhesion of the material to the underlying substrate, deterioration and damage.

WATER DAMAGE

Water can dislodge, delaminate, and disturb friable asbestos-containing materials that are otherwise in good condition. Water can carry fibers as a slurry to other areas where evaporation will leave a collection of fibers that can become reentrained in the air. Water damage will have a significant effect on selection of a corrective method, i.e., it may eliminate certain types of sealants.

continued

OPERATIONAL FACTORS (continued)

EXPOSED SURFACE AREA

The exposed surface area of friable material has an effect on potential fiber fallout levels and the possibility for contact and damage. A useful criterion is whether the friable material is visible.

ACCESSIBILITY

If the material can be reached, it is accessible and subject to accidental or intentional contact and damage. Accessibility is an indicator of possible future exposure caused by contact or damage.

ACTIVITY AND MOVEMENT

This factor combines the effects of general causes that may result in contact and damage to friable material. These causes include air movement, building vibration from machinery or any other source, and activity levels of students or building workers. This factor is also an indication of future exposure potential.

AIR PLENUM OR DIRECT AIR STREAM

Friable asbestos-containing material within an air plenum or in an air stream, if undisturbed, has very low potential of contaminating the building's environment. However, it must be considered since contact or damage may occur during maintenance, repairs, renovations, or if the air stream is very turbulent.

QUALITATIVE FACTORS

FRIABILITY

The term friable is applied to material that can be crumbled, pulverized, or reduced to powder in the hand. In order to score the material in question, it must be touched. The asbestos-containing material can vary in degree of friability. The more friable the material, the greater the potential for asbestos fiber release and contamination. Sprayed asbestos material is generally more friable than most trowelled materials.

ASBESTOS CONTENT

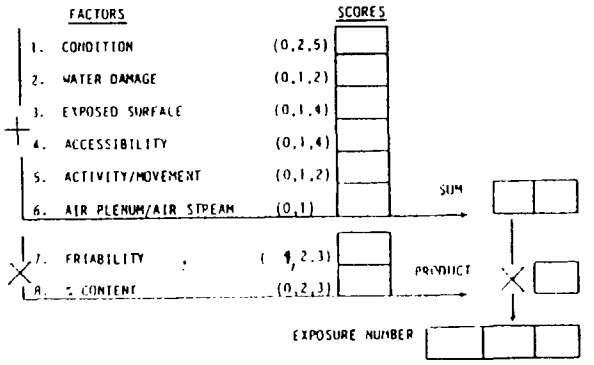
The percentage for all types of asbestos present should be added for the total asbestos content. With a high percentage of asbestos, there are more fibers that can be released and contaminate the building environment.

Figure 1 AN ALGORITHM
for
Assessment of Friable Asbestos-Containing Materials

Exposure Factor	Range or Extent*	Score
1. Material Condition (Deterioration/ Damage)	None	0
	Moderate; small areas	2
	Widespread; severe; pieces dislodged	5
2. Water Damage	None	0
	Minor	1
	Moderate to Major	2
3. Exposed Surface Area	Not exposed. Located above suspended ceiling. None visible without removing panels or ceiling sections	0
	10% or less area exposed	1
	10% to 100% area exposed	4
4. Accessibility	Not accessible	0
	Low: rarely accessible	1
	Moderate to high: Access may be frequent	4
5. Activity and Movement	None or low; Libraries and most classrooms	0
	Moderate: some classrooms, and corridors	1
	High: some corridors and cafeterias, all gymnasiums	2
6. Air Plenum or Direct Air Stream	None	0
	Present	1
7. Friability	Low friability. Difficult but possible to damage by hand.	1
	Moderate friability. Fairly easy to dislodge and crush	2
	Highly friable. Fluffy, spongy, , flaking, pieces hanging	3
8 Asbestos Content (total % present)	Trace to 1%	0
	1% to 50%	2
	50% to 100%	3

* More elaborate descriptors are provided in the example Asbestos Exposure Assessment Guide that follows in this document.

ALGORITHM CALCULATIONS



DOCUMENTING EXPOSURE ASSESSMENTS

Table IV may be reproduced and used as a package for documenting assessments of asbestos-containing materials that are sprayed-on or trowelled-on to interior surfaces in buildings. A sample of completed front page of this document is shown below.

The last two pages of this assessment guide contain information that can be of value in architectural and engineering decisions concerning corrective measures. Use of these pages in early survey steps can save a good deal of time and resources. This information can be used, often, to further substantiate needs for specific control measures.

Use of photography in this documentation process can be of tremendous value for several professional purposes. One can serve best interests by using photography in anticipation of possible litigation many years henceforth.

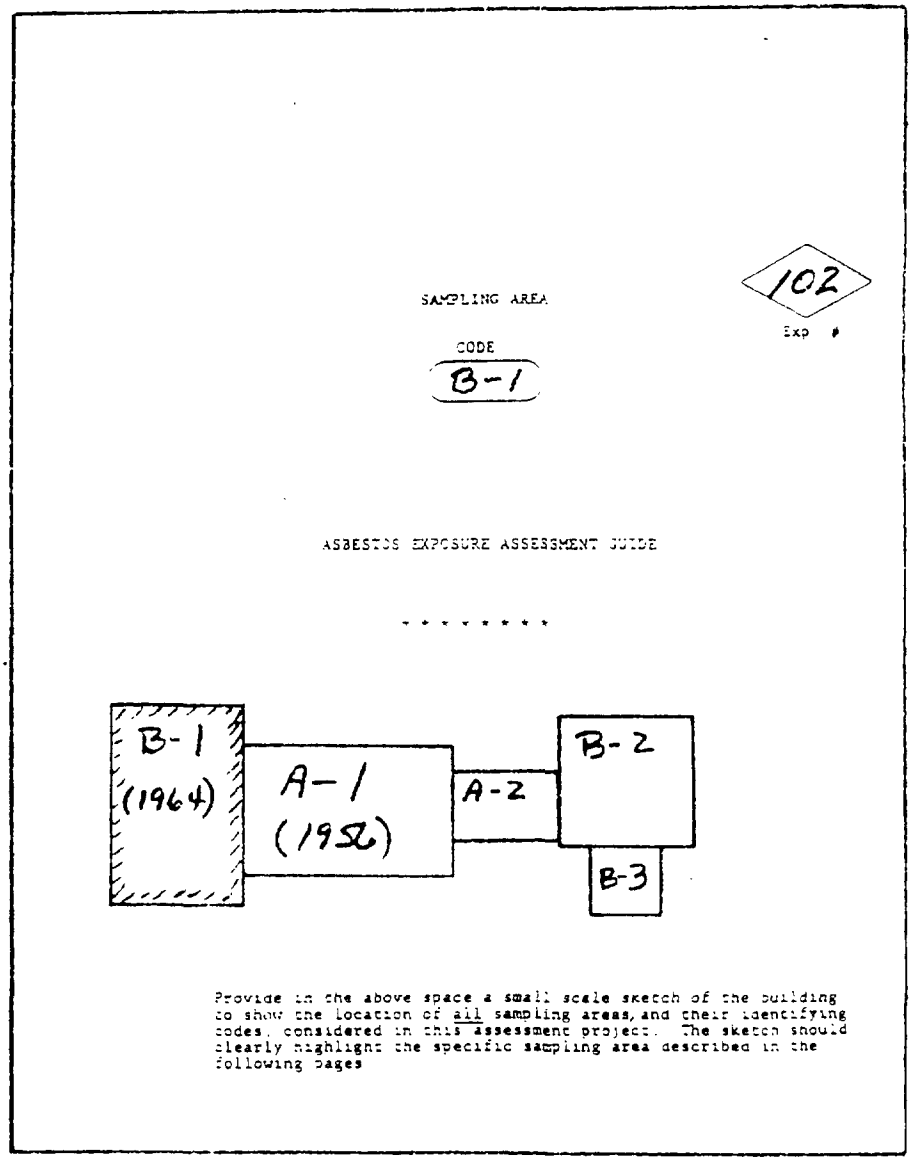


TABLE I - Examples in Use of the Algorithm

Proper use of the asbestos exposure algorithm requires training. Otherwise, results will vary greatly. Examples provided below serve only to orient the reader to the algorithm's purpose. Training in use of this algorithm is essential to obtaining valid results.

When proper quality assurance procedures, have been followed in the collection of bulk samples, specific "sampling areas" will have been established. A "sampling area" is designated on the basis of material characteristics and the dates of asbestos installation. This is a fairly arbitrary designation, one in which good judgment suggests creation of additional sampling areas if there is any doubt at all about the content of suspect materials.

If, for example, two parts of a building were built ten years apart, then the possibility could exist that the material characteristics in the two parts could be significantly different, and could warrant separate sampling and analysis. It is important to know the chemical contents of any suspect mixture, for this knowledge can suggest which sealants might be appropriate for encapsulating the mixture.

The general condition or characteristics of the suspect material can often vary so drastically from room to room, depending on a variety of environmental factors, and separate sampling area designations could be warranted. In these cases, the variations in conditions might suggest variation in mixtures that might warrant additional sampling. The cost of sampling and analyses is cheap compared to the expense of unnecessary corrective work. We know one school that removed $600,000.00 worth of cellulose simply because of insufficient analysis. In that case, adequate analyses could have been obtained for about $60.00.

Exposure assessments should be made for each building or for discrete areas of large buildings. The result of a number of assessments will be a priority list of problems. The priority is based on the relative potential of respirable asbestos fibers being created in the various sampling areas. This algorithm result does not, in any way, measure specific health risk to a building occupant. The exposure number of a sampling area is also designed to lead architects and engineers toward a proper course of corrective action for buildings (or parts of a building) represented by the sampling areas.

The algorithm is an aid to good judgment only. Specific decisions on corrective measures are the traditional prerogative of professional architects and engineers. The corrective action scale for the algorithm's use is contained in Table III. This scale is an excellent communications device, provided it is not used to an extreme. The following examples of algorithm use come from actual school situations. The descriptions are followed by a summary of the specific corrective measures taken.

EXAMPLE A

This is an urban school gymnasium, All overhead surfaces, beams and ceiling were open and covered with moderately friable asbestos, 70% chrysotile. The ceiling was approximately 24 feet high, had minor water damage, and some scattered areas of damage from balls and other objects. The gym had a scale number of 78. Upon recognition of the problem, the gymnasium was closed. Following negotiations with a contractor, the asbestos was removed. Accoustical tile was used as replacement.

EXAMPLE B

This is an elementary school corridor with a 12 foot high structural overhead and a 10 foot high hung open grid ceiling. Behind the grid system are electrical lines, heating and ventilation ducts, plumbing lines, and lights. The material is 20% chrysotole asbestos and is highly friable. All overhead surfaces, ducts, and louvers within the grid system are coated. Fallen fiber has been analyzed and it contains asbestos fibers. The grid is rarely disturbed and entry for maintenance is rare. This corridor's exposure number was 48. The school's operation continued for 5 months until the summer vacation period. Wet cleaning methods were utilized during the remainder of the year. Removal was not the corrective action used because of the complex surface area involved. The grids were removed and the framework was resurfaced and used to support a taped sheetrock ceiling (a barrier). A control system to prevent inadvertent entry (through the barrier) was initiated.

EXAMPLE C

This is a high school auditorium ceiling of 20-30% asbestos that has low friability. The forward area is very high and essentially undamaged. The forward section of auditorium has a scale number of 10. Deferring action was considered, but the final decision was to encapsulate with a penetrating sealant to stop fiber fallout, but retain some accoustical qualities.

EXAMPLE D

This is the same auditorium as above. The rear of the structure is 8 feet above the floor and it is damaged heavily by student activity. This section of the auditorium has an exposure number of 26. Because of the evident damage, the potential for continuing damage and exposure, and the space limitations, removal was selected. A relatively hard surface accoustical tile was used as replacement.

EXAMPLE E

This is a high school corridor, approximately 12 feet high with exposed, highly friable material (30% chrysotile asbestos content). The material is severely damaged by student activity, renovation, and water. The asbestos appears to be delaminating in some areas. Custodians report that fiber is found daily on the floor. Ventilation and heating duct air flow is directly onto the friable material. The exposure number totaled to 96. In what was obviously a high potential situation, corrective action was deferred for some time. Upon reconsideration of the facts, removal was carried out.

EXAMPLE F

This is a classroom area in a middle school having 10-15% chrysotile asbestos on steel beams behind an intact hung ceiling system. The material is moderately friable and in excellent condition. The hung ceiling system is intace and entered occationally (estimated as less than 5% of the time). The classroom area's exposure number was 5. Action was deferred. A surveillance system of inspections on a six month schedule had begun, the custodians sign-in log book (a check-point for all building work) carries an asbestos caution stamp on every page, and a procedure has been instituted for checking all work orders for that school. Although the scale number is low, spraying with a penetrating sealant is being considered.

EXAMPLE G

This is a machinery space/custodian office in a suburban middle school. A mixture of amosite and chrysotile asbestos, totalling 30%, has been sprayed over a complex of overhead beams and lines. No students enter the area, activity is low, and the material is in good condition and highly friable. The custodian space has an exposure number of 30. The overhead surfaces were encapsulated with a spray-applied bridging sealant. Removal was eliminated as an option because of the complexity of the surface, and enclosure was ruled out due to the necessity for access.

Numerical calculations for the above examples are shown in Figure I-1.

Figure I-1

ALGORITHMS FOR EXAMPLES A-G

Factors	School situation examples						
	A	B	C	D	E	F	G
1. Conditions/damage	2	2	0	5	5	0	0
2. Water damage	1	0	0	0	1	1	0
3. Exposure	4	4	4	4	4	0	4
4. Accessibility	3	1	0	3	3	1	1
5. Activity/movement	3	1	1	1	2	0	0
6. Plenum/airstream	0	0	0	0	1	0	0
SUM	13	8	5	13	16	2	5
7. Asbestos content	3	2	2	2	2	2	2
8. Friability	2	3	1	1	3	2	3
PRODUCT:	6	6	2	2	6	4	6
Scale number: (Sum x Product)	78	48	10	26	96	8	30

Table II.—Calculation of Exposure Number

Factor number	Factor score
1. Material Condition:	
No damage or deterioration (0)	
Moderate damage or deterioration (2)	
Severe damage or deterioration (5)	
2. Water Damage:	
No water damage (0)	
Minor water damage (1)	
Moderate to major water damage (2)	
3. Exposed Surface Area:	
No material is exposed (0)	
10 percent more or less is exposed (1)	
More than 10 percent is exposed (4)	
4. Accessibility:	
Not accessible (0)	
Rarely accessible (1)	
Accessible (4)	
5. Activity and Movement:	
Little or no activity (0)	
Moderate activity (1)	
High activity (2)	
6. Air Plenum:	
No plenum or direct air stream (0)	
Plenum or direct air stream (1)	
Sum [Add the scores of Factors 1 through 6]	
7. Friability:	
Low friability (1)	
Moderate friability (2)	
High friability (3)	
8. Asbestos Content:	
0 to 1 percent (0)	
More than 1 percent up to 50 percent (2)	
More than 50 percent (3)	
Product [Multiply the score of Factor 7 by the score of Factor 8]	
Exposure Number [Multiply the Sum by the Product]	

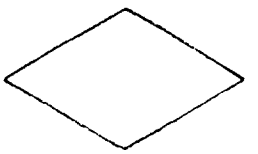
Table III. Corrective Action Scale

The Corrective Action Scale provides guidance for the choice of appropriate corrective action based on the Exposure Number determined from Table II. While in most cases the Exposure Number will indicate the most appropriate corrective action, not all possibilities can be predicted with the algorithm.

In those situations in which there is some overlap in the Exposure Number Ranges or in which one of the eight factors described in Table I has an overriding effect of fiber release (see "Using the Algorithm: Step 3"), the choice of appropriate corrective action should be based on the considerations listed for each applicable range.

Corrective action	Exposure number range
Deferred action:	0–12
(a) Advantage: There is no immediate cost associated with deferred action.	
(b) Disadvantages:	
(1) The potential for exposure may increase.	
(2) A management system is required. Precautions are necessary to prevent damage during maintenance or renovation.	
(3) It is necessary to have continuous inspection and reevaluation.	
(c) When Appropriate:	
When there is negligible exposure potential.	
(d) When inappropriate:	
(1) When there is definite or questionable exposure potential.	
(2) When continuing inspection is doubtful.	
Encapsulation:	10–60
(a) Advantages:	
(1) It controls fiber release.	
(2) It is a rapid and economical method.	
(b) Disadvantages:	
(1) The source of the asbestos remains in the building.	
(2) If the material is damaged or deteriorating, the additional weight of the sealant may cause layers of the material to break away from the underlying surface.	
(3) A management system is required. Precautions are necessary to prevent damage during maintenance or renovation.	
(4) Requires continuing inspection and maintenance for damage or deterioration to encapsulated surface (i.e., future potential for fiber release is possible).	
(5) Encapsulated material is very difficult to remove if removal becomes necessary (for instance, when the building is eventually demolished).	
(c) When appropriate:	
(1) When removal is not feasible.	
(2) When the material is of low friability.	
(3) When the material still retains bonding integrity.	
(4) When damage to the material is not probable.	
(5) When accessibility to material is limited.	
(6) When the surface in question is complex (e.g., pipes, lines, and ducts).	
(7) When there are economic or time constraints.	
(d) When inappropriate:	
(1) When removal is feasible.	
(2) When the material is highly friable.	
(3) When the material does not adhere well to the substrate. The weight of the sealant may cause further damage or failure.	
(4) When the material is deteriorating or damaged.	
(5) When damage to the material is probable.	
(6) When water damage or the potential for water damage is evident.	
(7) When there is high accessibility.	
(8) When continuing inspection and maintenance of encapsulated material are doubtful.	
Enclosure:	10–60
(a) Advantages:	
(1) It controls fiber release.	
(2) It may be the most rapid, economical, and uncomplicated method.	
(b) Disadvantages:	
(1) The source of the asbestos remains in the building.	
(2) Fiber fallout continues behind the enclosure.	
(3) It may be costly if enclosure disturbs functions of other systems (e.g., enclosure may require lighting changes).	
(4) A management system is required. Precautions are necessary for entry into enclosure for maintenance or renovation.	
(5) Continuing inspection and maintenance of damage to enclosure system are required.	
(c) When appropriate:	
(1) When removal is not feasible.	
(2) When disturbance or entry into enclosed area is not likely.	
(d) When inappropriate:	
(1) When removal is feasible.	
(2) When damaged or deteriorating material causes a high level of fiber fallout.	
(3) When water damage to enclosure is likely.	
(4) When entry into enclosure is likely for repairs and maintenance.	
Removal:	40+
(a) Advantages:	
(1) It eliminates the source of the asbestos.	
(2) It ends the exposure and precludes the development of future problems.	
(b) Disadvantages:	
(1) It is usually the most costly, complicated, and time-consuming method.	
(2) Replacement of the removed material with substitute material may be necessary.	
(3) There is a higher potential for exposure of workers to asbestos hazards.	
(c) When appropriate:	
(1) When there is high exposure.	
(2) When the material is deteriorating, highly accessible, or has severe water damage.	
(3) When open material surfaces exist.	
(d) When inappropriate:	
(1) When removal is not feasible because of the location of the material and the kind of surface to which the material has been applied (e.g., removal of material from complex surfaces such as pipes, lines, and ducts may be difficult).	
Summary	
(a) If the Exposure Number is 0–12, deferred action is usually appropriate.	
(b) If the Exposure Number is approximately 40 or more, removal is usually the best corrective action.	
(c) If the Exposure Number is 10–50 and there is severe water damage or high accessibility, removal is the best corrective action.	
(d) If the Exposure Number is 10–50 and the water damage and accessibility factors are low, various factors—such as economic and time constraints and complexity of the surfaces—need to be examined. The three corrective actions possible are encapsulation, enclosure, and removal.	

Table IV



Exp. #

SAMPLING AREA

CODE

ASBESTOS EXPOSURE ASSESSMENT GUIDE

* * * * * * * * *

Provide in the above space a small scale sketch of the building to show the location of all sampling areas, and their identifying codes, considered in this assessment project. The sketch should clearly highlight the specific sampling area described in the following pages.

FACTOR ONE. CONDITION OF MATERIAL

Material condition may indicate the possibility of contamination (i.e., fibers released to the area) and the potential of future contamination. It is a combination of the quality of the installation, adhesion of the material to the underlying substrate, deterioration and damage. This factor is comprised of three levels:

0 - NO DAMAGE: Material is intact and shows no signs of deterioration.

2 - MODERATE DAMAGE: Through visual inspection and physical contact there are indications that the material is breaking up into layers or beginning to fall. There may be small areas where the material is deteriorating. There may be signs of accidental or intentional damage.

5 - SEVERE DAMAGE: The material is non-cohesive. Pieces are dislodged and debris in the area is evident. Parts of the material may be suspended from the ceilings or fallen to the floor. Inspect for severe accidental or intentional damage.

Sampling Area Code ( )

Material Condition Factor Score (0, 2, or 5) ( )

Describe the specific characteristics of the material condition in this sampling area:

Attach photographs here that depict the above material conditions. Label photographs by locations.

FACTOR TWO. WATER DAMAGE

Water can dislodge, delaminate, and disturb friable asbestos-containing materials that are otherwise in good condition. Water can carry fibers as a slurry to other areas where evaporation will leave a collection of fibers that can become reentrained in the air. Water damage will have a significant effect on selection of a corrective method, i.e., it may eliminate certain types of sealants. This factor is comprised of three levels:

0 - NO WATER DAMAGE: No water stains or evidence of the material being disturbed by water. No stains on the floor or walls to indicate past water damage.

1 - MINOR WATER DAMAGE: Small areas of the material or adjacent floor and/or walls show water stains and ceiling material may be slightly buckled. However, pieces have not fallen from the ceiling and the damage affects 10 percent or less of the material.

2 - MODERATE TO MAJOR WATER DAMAGE: Water has dislodged some of the material and caused the material to break away, or has become saturated and has the potential to fall, and/or greater than 10% of the material has been affected.

Attach photographs here that depict water damage or the lack thereof in the sampling area. Label photographs by locations.

Sampling Area Code ( )

Water Damage Factor Score (0, 1, or 2) ( )

Describe the specific water damage circumstances in this sampling area:

FACTOR THREE: EXPOSED SURFACE AREA (0,1,4)

Attach photographs here that depict the exposed surface area. Label the photographs by locations.

The exposed surface area of friable material has an effect on potential fiber fallout levels and the possibility for contact and damage. A useful criterion is whether the friable material is visible.

Asbestos material above a suspended ceiling is not considered exposed unless: (1) the ceiling panels are removed for regular maintenance, (2) it is damaged due to vandalism, or (3) the space above the ceiling comprises an air plenum.

Areas with louvers, grids, or other open ceiling systems should be considered exposed. This factor is comprised of three levels:

0 - MATERIAL NOT EXPOSED

1 - TEN PERCENT OR LESS OF THE MATERIAL IS EXPOSED

4 - GREATER THAN TEN PERCENT OF THE MATERIAL IS EXPOSED

Sampling Area Code ( )

Exposed Surface Area Score (0,1,4) ( )

Describe the specific characteristics of the exposed surface area:

FACTOR FOUR: ACCESSIBILITY

If the material can be reached, it is accessible and subject to accidental or intentional contact and damage. Accessibility is an indicator of possible future exposure caused by contact or damage.

The proximity of the friable material to heating, ventilation, lighting, and plumbing systems requiring maintenance or repair indicates accessibility.

Also, the behavior of the student population should be considered in evaluating accessibility. For example, students involved in sport activities may accidently cause damage to the material on the walls and ceilings of gymnasiums. Material that is easily accessible is also subject to damage by vandalism. This factor is comprised of three levels:

0 - NOT ACCESSIBLE. The material is located above a suspended ceiling or is concealed by ducts or piping. The building occupants cannot contact the material.

1 - RARELY ACCESSIBLE: The material is contacted only during abnormal activity such as infrequent maintenance or repair. Building occupants rarely touch the material or throw objects against it.

4 - ACCESSIBLE: Material is contacted frequently due to routine maintenance. The building occupants can contact the material during normal activity. During this activity occupants could touch and dislodge the material or throw objects against it.

Sampling Area Code ( )

Accessibility Factor Score (0,1,4) ( )

Describe the specific accessibility characteristics in sampling area:

Attach photographs that depict the accessibility characteristics. Label photographs by locations.

FACTOR FIVE: ACTIVITY AND MOVEMENT

This factor combines the effects of general causes that may result in contact and damage to friable material. These causes include air movement, building vibration from machinery or any other source, and activity levels of students or building workers. This factor is also an indication of future exposure potential. This factor is comprised of three levels:

0 - NONE OR LOW ACTIVITY: This level would normally include such areas as administrative offices, libraries, and those class rooms where the population is quiet and non-destructive.

1 - MODERATE ACTIVITY: This level describes cafeterias, corridors, classrooms or other areas where activities exist that could create undue vibration. This vibration could result in fibers being released from the material to the immediate area.

2 - HIGH ACTIVITY LEVEL: This level may be found in cafeterias and corridors whose occupants are vandalous or disruptive in their activities. This also includes all gymnasiums and rooms containing machinery.

Attach photographs here that depict the typical kinds of activity and movement in this sampling area. Label photographs by location.

Sampling Area Code ( )

Activity and Movement Factor Score (0,1,2) ( )

Describe the specific kinds of activity and movements that occur in this sampling area:

FACTOR SIX: AIR PLENUM OR DIRECT AIR STREAM

Attach photographs here that depict the circumstances of an air plenum or direct air stream. Label photographs by location.

Friable asbestos-containing material within an air plenum or in an air stream, if undisturbed, has very low potential of contaminating the building's environment. However, it must be considered since contact or damage may occur during maintenance, repairs, renovations, or if the air stream is very turbulent. This factor is comprised of two levels:

0 - NO AIR PLENUM OR DIRECT AIR STREAM PRESENT

1 - AIR PLENUM OR DIRECT AIR STREAM PRESENT

Sampling Area Code ( )

Air Plenum or Direct Air Stream Factor Score (0,1) ( )

Describe the specific characteristics of this sampling area's air handling systems:

FACTOR SEVEN: FRIABILITY

The term friable is applied to material that can be crumbled, pulverized, or reduced to powder in the hand. In order to score the material in question it must be touched. The material can vary in degree of friability. The more friable the material, the greater the potential for asbestos fiber release and contamination. Sprayed asbestos material is generally more friable than most trowelled materials. This factor is comprised of three levels:

1 - LOW FRIABILITY: Material that is difficult yet possible to damage by hand.

2 - MODERATE FRIABILITY: Fairly easy to dislodge and crush or pulverize. Material may be removed in small or large pieces.

3 - HIGH FRIABILITY: The material is fluffy, spongy, or flaking and may have pieces hanging down.

Sampling Area Code ( )

Friability Factor Score (1,2,3) ( )

Describe the sampling area's material's friability characteristics:

Attach photographs here that might depict friability of the material. Label the photographs by location.

FACTOR EIGHT: ASBESTOS CONTENT

The percentage for all types of asbestos present should be added for the total asbestos content. With a high percentage of asbestos, there are more fibers that can be released and contaminate the building environment. Therefore, if certain areas are identical in their assessment using the other seven factors, this factor will be helpful in establishing priorities and indicating which area needs to be addressed first. This factor is comprised of three levels:

0 - TRACE AMOUNTS TO ONE PERCENT

2 - ONE PERCENT TO FIFTY PERCENT

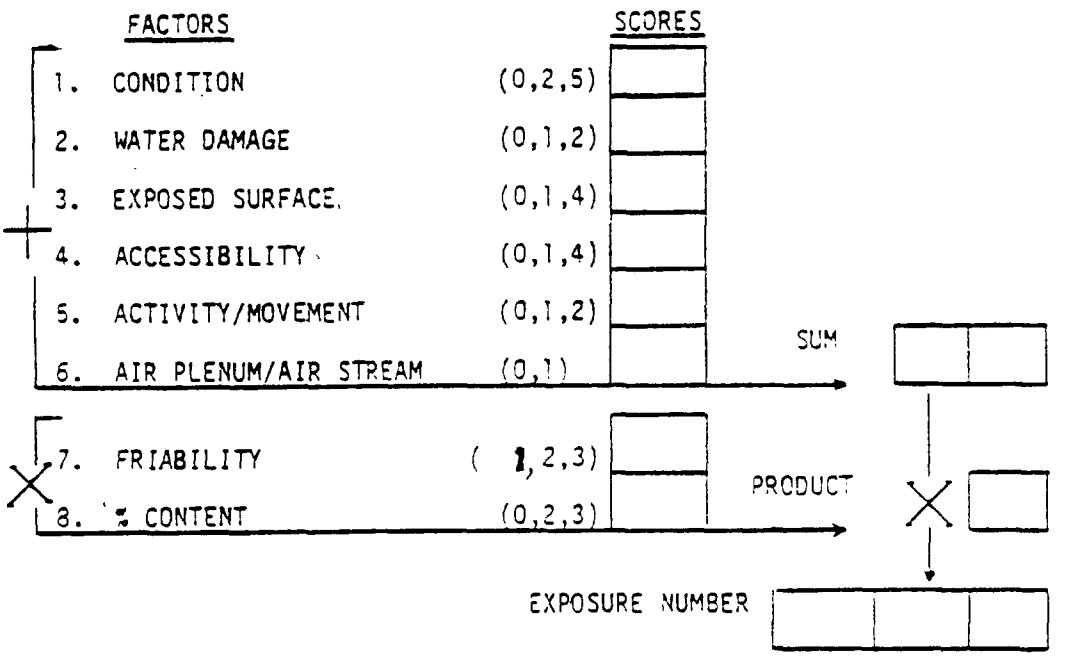
3 - FIFTY PERCENT TO ONE HUNDRED PERCENT

Sampling Area Code ( )

Asbestos Content Factor Score (0,1,4) ( )

Provide attachments that substantiate proper analysis of all bulk samples taken of the material from this sampling area. Be certain that proper laboratory identifications are made and that quality assurance measures in sampling and analysis are described.

Numerical Calculations
for
Exposure Number (Index)



COMMENTS: _____

SAMPLING AREA ( )

INITIAL SURVEY DATA

Building name: _____

Address: _____

_____

* * * * * * * *

Type of Building: Elementary Jr. High

Sr. High Other _____

Date Constructed: _____ Date Renovated: _____

Areas Renovated _____

* * * * * * * * *

Type of Construction: Pre-Cast Concrete Steel Frame Masonry

Cast in Place Concrete Wood Other _____

Type of Roof: _____

Type of Ceiling:

Concrete Plasterboard Corrugated Steel Suspended Metal Lath

Concrete Beam Steel Beam or Bar Joists Suspended Tile

Ceiling Height: _____ft. Ceiling Shape: Flat Dome Folded Plate Barrel

Coated Area: Ceiling Wall Sq. Ft. (Suspect) Material _____

Type of Walls(if coated): Smooth Concrete Rough Concrete Metal

Masonry Block Plasterboard

Description of Wall Coating: _____

_____

Type of Lighting: Surface Mounted Suspended Recessed No. of Lights ___

Type of Heating/Cooling System: _____

Type of Floor: Concrete Tile Wood Carpet Other: _____

Number of Floors: _____ Basement: Yes No

What is above the sampling area being evaluated? _____

* * * * * * * *

(continued)

Number of Faculty:_____ Number of Students:_____

Number of Evenings Building used per Week:_____

Parts of Building Used in Evening:_____

Purpose of Evening Use:_____

Building Owner or Manager Contacted:_____

_____ _____

Evaluator Date

* * * * * * * *

Provide any additional information that may be useful for architectural or engineering purposes below.