

**Furnace Blow Back
at
High School**

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January 1996

RESTORER'S STATEMENT

This formal report is an assessment of the damage caused by a malfunction to the heating system in a commercial building. The purpose of the assessment is to establish the scope of damage, remedies and cost. I have been asked by the school system to establish the time factors needed to restore the building to safe conditions and a firm date on when classes can resume. All of the information in this report is based on my on-site examination, inspection and professional opinion.

The purpose of the report is to provide a documented description of the damage to the property and provide restoration specifications, prices and establish a time commitment for completion of the work.

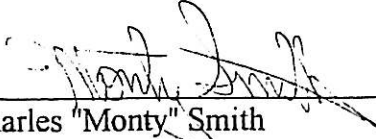
Inspection and testing procedures utilized are based on accepted professional industry standards. The areas inspected are limited to accessible areas at the time of inspection on visual surfaces only.

Other participants in the report are Tom Light and Joe Rings, associates with our firm. Inspection of the furnace system was conducted by the school district's maintenance department, Clean Harbors Heating and Cooling and Mowhawk Heating and Cooling, Inc. J.W. Stevens conducted an environmental safety inspection for the school district.

Restoration involves work required to return the property and content items back to pre-loss condition. This does not include pre-existing conditions or regularly scheduled maintenance for the facility. The task involved in the restoration process would include cleaning, washing, dry cleaning, deodorization and painting.

This report should be used by the school district and the insurance company to establish the restoration work needed to restore property to pre-loss condition.

Charles "Monty" Smith the author of this report has no financial interest in the damaged property discussed in this report or the insurance carrier insuring the property. Mr. Smith is not related to any employee or state official involved with the school district. My interest in the project is to provide an authoritative formal report recording the facts as I know them. My recommendations are to assist the school district, insurance carrier and the restoration firm involved with the restoration process.



Charles "Monty" Smith



Date

INTRODUCTION

The inspection assignment was received from the Saratoga High School facilities director Mr. Bruce Johnson, at 7:15 A.M. on April 18, 1995. Approximately 60% of the classrooms and administrative offices were contaminated with furnace soot. The furnace malfunction had occurred overnight and classes were to be canceled for the balance of the week.

The property is located at Route 9, Halfmoon NY 12063 and is maintained by the Saratoga school district.

An appointment was scheduled for 8:30 A.M. to inspect the property. The purpose of the inspection is to prepare a damage appraisal and submit an itemized scope of work to include prices for repair and restoration of the damaged property. The school system was concerned when immediate clean-up procedures would begin so the school could re-open as soon as possible.

BACKGROUND

Realizing the furnace malfunction had dispersed soot throughout the structure the Director of Facilities contacted the insurance agent for the school and Purofirst, a local restoration company. Appointments were scheduled for the same morning with an emphasis for immediate response.

The insurance agent, Tom Duley, was on site at the time of my arrival and had reported the loss to the insurance company. Mr. Duley authorized emergency services to begin pending the arrival of an insurance adjuster from the insurance company.

According to the insurance agent the fire department arrived on the scene at 5:52 A.M. The fire department classified the loss as a furnace malfunction with no hostile fire present at the time of arrival. Heavy smoke was present and the fire department began procedures to exhaust the smoke. Precautions were taken by the fire department to seal unaffected areas before smoke removal to prevent exposure of unaffected areas.

I recommended that the building be sealed from the public to prevent unsafe exposure and traffic control. It was determined by the school principal that classes would be canceled for the remainder of the week and the general public and students should be notified.

INVESTIGATION

The procedures involved in preparing this report are based on personal on-site inspection and evaluation. Direct visual observation and professional testing methods were used to identify the extent of the smoke damage to the dwelling and contents.

Interviews were conducted with the school officials, maintenance staff, and independent HVAC contractors. The author of this report was asked to include the results of these interviews in this report in an effort to document all pertinent information relating to the furnace and its malfunction.

The testing methods used to determine the presence of smoke residue or other foreign substances caused by smoke involved the principals of contrast. This method provides for a comparison after wiping over the surfaces of items in the dwelling using absorbent wipe materials to visually observe contrast which reveals the degree of smoke residue. Contrast also involves comparisons between affected and unaffected areas. Tests were completed in all areas of the property.

INSPECTION

Present during the on site inspection of the damaged property on April 18, 1995, were Tom Light, of Purofirst, Frank Gennet the Superintendent of schools for the district, John Golden, School principal, Bruce Johnson director of maintenance, Tom Duley, the insurance agent and Monty Smith, the person who conducted the investigation.

When I arrived at the property, the weather conditions were: overcast skies, no wind or precipitation with a temperature of 25 degrees F, and a 55% relative humidity.

A description of the structure, including exterior and interior include:

Structure type- public building used for primary education.

Construction- Concrete block and stone exterior structure with steel beam roof framing.

Construction method- site built.

Roof-flat built-up roofing.

Interior sprinkler system

Interior Construction- Concrete walls on exterior walls, drywall on interior walls with acoustical ceilings.

Flooring- tile floors in common areas with carpet in select classrooms and offices.

Contents- excessive in quantity with a variety of electronic equipment, computers and furniture..

This is a typical High School building built on a concrete slab see PHOTOGRAPH 1.

The total space under roof of this school is 148,005 square feet. The affected portion of the building is the front or west side of the building. This included the administrative offices, teacher work areas, gym, locker rooms, drafting rooms, art room and equipment, library, auditorium, computer classrooms, bandroom, and restrooms.

The property was in good general condition before the occurrence of the furnace mishap. From my observation the building has been satisfactorily maintained and the painted surfaces are maintained on a regular schedule according to the Facilities Director.

The wall to wall carpeting in the classroom areas are a commercial grade level loop carpet. The general condition of the carpet is good, however a large quantity of stains and chewing gum is evident.

Investigation of the fire was performed by the County Fire Marshall, who determined the soot damage to be caused by the furnace. There was no flame damage related to this mishap and no water damage was evident.

It appears from my examination and visual inspection, that the smoke migrated from the basement furnace room into the hallway and adjacent offices. Throughout the hallway are ventilation grills which allow air to move freely from the halls to the classrooms. These provided the passageway for the air born particulates contained in the smoke to move into the classrooms. (See diagram for location of ventilation grills.) PHOTOGRAPH 12-14 show grills.

The cause of the furnace blow-back is as follows: this furnace has been burning #4 fuel oil for a few years that is not as refined as #2 fuel oil. The school received a delivery the day before the malfunction occurred which may have stirred up sediments in the fuel tanks. Grit was discovered in the shut-off valve system which prohibited the valve from seating properly. Since the fuel tanks are below grade, the fuel is pumped from the tanks with a continuous feed pump system. Oil continued through the unseated valve while the burners were at rest filling the chamber and the fire bricks below with fuel. When the furnace ignited, excessive flame was fed by the abundance of fuel as well as ignition of the fire brick below the furnace itself. Absorbed fuel in the brick created a slower burn with a larger abundance of soot material. The warm, contaminated air moved into areas of cooler air in the hallway and the surrounding air duct system. Soot was also moved throughout the building by the exhaust fans used when the fire department ventilated the building.

Furnace Room- sustained heavy soot damage to the ceiling, walls and floors. The furnace received no operational damage but needs extensive cleaning. The electrical panels, compressors and other miscellaneous equipment will require cleaning. The walls at the staircase and landing will require painting. PHOTOGRAPHS 2-8

Room 208- The teacher's photo copy area shows heavy concentrations of soot particles with evidence that the smoke had also entered the space above the drop ceiling. The walls require cleaning and painting and the tile floor can be cleaned satisfactorily. The photo copiers will require cleaning to the interior components as well as the exterior. The photo copiers should be cleaned by a qualified electronic's technician. PHOTOGRAPHS 11, 12, 15, 16.

Auditorium- The duct system should be thoroughly cleaned as well as the ceiling, walls and the floor covering. The organ, piano, electronic equipment can be cleaned by the on-site restoration professionals. The stage draperies and upholstered seat cushions and backs should be professionally cleaned to remove all soot residue. Upon direct inspection of the seat cushions a large quantity of pre-existing soil is evident. This may require additional effort by the cleaning staff to avoid streak lines in the fabric. PHOTOGRAPH 22

Main Lobby- The ceiling, walls and tile floor should be cleaned as well as the trophy case and the contents inside. Soot is present inside the trophy case and due to the acid nature of furnace soot corrosion may occur if precautions are not taken. PHOTOGRAPH 31 and 32

Southwest Wing, classrooms located in the southwest area of the building to include, rooms # 227, 225, 223, 221, 228, 226, 224, and 222 show evidence of light soot throughout the classroom area. The drop ceiling tiles sustained residue as well as the light fixtures. The walls, chalkboards and miscellaneous maps show light soot on the surface while there is no evidence of soot behind these items. The venetian window blinds show soot particles combined with pre-existing household dust. The carpeted areas appear to be in good condition however pre-existing stains and gum are evident. All of the contents exposed to the ambient air areas show light amounts of soot particles. PHOTOGRAPH 33

Music Class's, Rooms 216, 218 show evidence of light soot throughout the classroom area. The drop ceiling tiles sustained residue as well as the light fixtures. The walls, chalkboards and miscellaneous posters show light soot on the surface while there is no evidence of soot behind these items. The vertical window blinds show soot particles combined with pre-existing household dust. The carpeted areas appear to be in good condition however pre-existing stains and gum are evident. All of the contents exposed to the ambient air areas show light amounts of soot particles.

Computer Class's, Rooms 217, 219 show evidence of light soot throughout the classroom area. The drop ceiling tiles sustained residue as well as the light fixtures. The walls, chalkboards and miscellaneous posters show light soot on the surface while there is no evidence of soot behind these items. The venetian window blinds show soot particles combined with pre-existing household dust. The floor covering areas appear to be in good condition. All of the contents exposed to the ambient air areas show light amounts of soot particles. The computers, printers and other components have very small amounts of soot particles and light cleaning is all that is necessary in these areas. PHOTOGRAPHS 23, 30

Photo Copy Center, Rooms 213, 215 show evidence of medium amounts of soot throughout the area. The drop ceiling tiles sustained residue as well as the light fixtures. The walls and shelving show light soot on the surface while there is no evidence of soot behind these items. The venetian window blinds show soot particles combined with pre-existing household dust. The floor covering areas appear to be in good condition. All of the contents exposed to the ambient air areas show medium to heavy amounts of soot particles. The photo copy equipment in this area should be service by trained technician. The interior components should be cleaned as well as the equipment's exterior. PHOTOGRAPHS 24 and 29

Restrooms/ CRR, BRR- Show evidence of light soot throughout the room areas. The drop ceiling tiles sustained residue as well as the light fixtures. The walls and ceramic tile show light soot on the surface while there is no evidence of permanent staining to the tile grout. The floor covering areas appear to be in good condition. All of the wall fixtures exposed to the ambient air areas show light amounts of soot particles as do the wall partitions.

Library- There is evidence of light soot throughout the library area. The drop ceiling tiles sustained residue as well as the light fixtures. The walls, bookshelves, books and audio visual equipment show light amounts of soot particles. The venetian window blinds show soot particles combined with pre-existing household dust. The carpeted areas appear to be in good condition however pre-existing stains are evident. All of the contents exposed to the ambient air areas show light amounts of soot particles. PHOTOGRAPHS 13, 19-21

Librarian's Workroom Room # 209- This area has a large quantity of paperwork, magazines and books. There is evidence of light soot throughout the library area. The drop ceiling tiles sustained residue as well as the light fixtures. The walls, bookshelves, books and audio visual equipment show light amounts of soot particles. The venetian window blinds show soot particles combined with pre-existing household dust. The carpeted areas appear to be in good condition however pre-existing stains are evident. All of the contents exposed to the ambient air areas show light amounts of soot particles. PHOTOGRAPH 19

Northwest Wing Room #205- This is a teacher's work area and shows evidence of light soot throughout the work area. The drop ceiling tiles sustained residue as well as the light fixtures. The walls, chalkboards and miscellaneous posters show light soot on the surface. The venetian window blinds show soot particles combined with pre-existing household dust. The floor covering areas appear to be in good condition. All of the contents exposed to the ambient air areas show light amounts of soot particles. The computers, printers and other components have very small amounts of soot particles and light cleaning is all that is necessary in these areas.

Room # 206- This is a teacher's lounge area with evidence of heavy soot throughout the area. The drop ceiling tiles sustained residue as well as the light fixtures. The walls show light soot on the surface. The venetian window blinds show soot particles combined with pre-existing household dust. The floor covering areas appear to be in good condition. All of the contents exposed to the ambient air areas show light amounts of soot particles. The computers, printers and other components have very small amounts of soot particles and light cleaning is all that is necessary in these areas.

Room # 203- Shows evidence of light soot throughout the classroom area. The drop ceiling tiles sustained residue as well as the light fixtures. The walls, chalkboards and miscellaneous posters show light soot on the surface while there is no evidence of soot behind these items. The vertical window blinds show soot particles combined with pre-existing household dust. The carpeted areas appear to be in good condition however pre-existing stains and gum are evident. All of the contents exposed to the ambient air areas show light amounts of soot particles.

Room # 202-204- Guidance office, Health office, show evidence of light soot throughout the room. The drop ceiling tiles sustained residue as well as the light fixtures. The walls, miscellaneous contents show light soot on the surface. The vertical window blinds show soot particles combined with pre-existing household dust. The carpeted areas appear to be in good condition however pre-existing stains are evident. All of the contents exposed to the ambient air areas show light amounts of soot particles. The contents inside the desk drawers do not show signs of contamination.

Boy's Locker area- Shows evidence of light soot throughout the room. The drop ceiling tiles sustained residue as well as the light fixtures. The walls and lockers show light soot on the surface and interior. The floor covering appears to be in good condition. All of the contents exposed to the ambient air areas show light amounts of soot particles.

Laundry Area- Shows evidence of light soot throughout the room. The drop ceiling tiles sustained residue as well as the light fixtures. The walls and laundry equipment reveal light soot on the surface and interior. The floor covering appears to be in good condition. All of the contents exposed to the ambient air areas show light amounts of soot particles.

Exercise Area- Shows evidence of light soot throughout the room. The drop ceiling tiles sustained residue as well as the light fixtures. The walls and weight lifting equipment reveal light soot on the surface and interior. The floor covering appears to be in good condition. All of the contents exposed to the ambient air areas show light amounts of soot particles.

Girl's Locker area- Shows evidence of light soot throughout the room. The drop ceiling tiles sustained residue as well as the light fixtures. The walls and lockers show light soot on the surface and interior. The floor covering appears to be in good condition. All of the contents exposed to the ambient air areas show light amounts of soot particles.

Rooms 102 & 104- Drafting class, shows evidence of light soot throughout the classroom area. The drop ceiling tiles sustained residue as well as the light fixtures. The walls and drafting tables show light soot on the surface of the tables. The floor covering appears to be in good condition with normal traffic and soil. All of the contents exposed to the ambient air areas show light amounts of soot particles.

Gymnasium- The west wall and bleachers show evidence of light soot throughout the area. The ceiling is a lay-in type ceiling with light amounts of residue evident. The score boards and miscellaneous contents attached to the walls should be cleaned.

Administrative Offices- Shows evidence of light soot throughout the work area. The drop ceiling tiles sustained residue as well as the light fixtures. The walls, chalkboards and miscellaneous posters show light soot on the surface. The venetian window blinds show soot particles combined with pre-existing household dust. The floor covering areas appear to be in good condition. All of the contents exposed to the ambient air areas show light amounts of soot particles. The computers, printers and other components have very small amounts of soot particles and light cleaning is all that is necessary in these areas.

PHOTOGRAPHS 25-28

Scope of Repairs

Upon my direct inspection and interviews with others on the project site, the paragraphs that follow give a general description of the types of work required to return the structure and contents to pre-loss condition:

The first phase of the project will require sealing and filtering the heating duct system. The duct system from the # 2 furnace unit has medium to heavy concentrations of soot particles. The furnace system should be thoroughly cleaned to prevent further contamination to the ducts themselves. Each air duct passage will have a temporary cheese cloth filter installed to capture particles moving through the system. A duct cleaning brush and vacuum unit will remove excess materials from the air duct. The air ducts are then to be sealed with an approved duct sealer and the filters are to be replaced. Cheesecloth filters are to remain in the system while the system is in operation for five days.

The drop ceiling tiles in the northwest corridor, faculty room, room 208, Guidance office and Health offices will be removed and the structure above this area including the grid system itself will be cleaned. Other areas of the school do not show evidence of soot contamination at the time of this inspection. These areas are to be re-examined following cleaning of the furnace and basement area.

It is my professional opinion that the structure and contents show little evidence of odor and that air wash methods should be preferred over heavy deodorants. This will be accomplished using smoke ejector fans and air-movers. Portable filtration units will be installed to filter air and prevent additional contamination during the process of the project.

Draperies, upholstered furniture and other fabric items will be pre-cleaned using a dry soot sponge to wipe the fabric surface then vacuuming to remove residue. These items will then be covered until final processing is completed. These items should receive final cleaning after the structural cleaning is complete and there is no danger of recontamination. The final step of all fabric items should be mechanically or hand cleaned to remove any remaining smoke residue.

All carpeting will be vacuumed to remove excess contamination. Traffic areas are to be covered with tarps to prevent additional soiling caused during ceiling cleaning and other project functions. Hard surface floors will be vacuumed and pre-washed to remove excess contamination.

Ceiling and wall surfaces requiring repair or painting will be pre-washed to prepare for painting. Absorbent and porous surfaces will be cleaned using soot dry sponges to remove the contamination. The sealed and non-porous surfaces will be pre-washed, rinsed, and dried.

All other structure items that do not require repair, painting, or resurfacing will be washed using alkaline detergents, rinsing, and drying to remove the smoke contamination.

Small washable content items will be pre-washed using alkaline detergents, rinsing, and drying to remove the smoke contamination. Unwashable items will be cleaned with solvents and dry compounds. Smoke odor counteractants will be added to all solutions used in the process to assist in odor removal.

Copytronics, a company used by the school system for normal maintenance of photocopiers, will inspect and clean the photocopiers.

The furnace system and basement area are to be thoroughly vacuumed and pre-washed using alkaline detergents, rinsing, and drying to remove the smoke contamination. The school system has selected an independent inspector to certify that the furnace is in good working order.

The school will open all lockers in the northwest and southwest corridors. See PHOTOGRAPH 9. The interior of the lockers will be pre-washed using alkaline detergents, rinsing, and drying to remove the smoke contamination. The miscellaneous contents in the lockers will receive vacuuming to remove contaminated soot particles.

On the basis of my investigation, inspection and professional opinion, the general description of the type of work required is characterized in the previous paragraphs. This information reflects an accurate picture of the remedies and procedures required to return the building to pre-loss condition.

The cleaning agents, compounds and supplies used will be of quality materials and meet or exceed industry standards for performance while safe for the environment. Material Safety Data Sheets for the cleaning agents will be on the project site and will be available for inspection.

The recommended standards of performance on this project will be as follows:

1. The school system or its assigned agent should maintain security of the property while the building is open and people are moving in and out. Teachers, students, faculty and the general public should have limited access to the property while work is underway. Only one entrance should be available and all persons entering the building are required to sign in. Any items to be removed from the property will be approved by the school system or its assigned agent prior to removal.
2. All service personnel are to maintain proper identification and/or wear uniforms identifying the approved company's involvement.
3. All sub-contractors are insured and licensed to perform the services required. Proper identification is required and uniforms are suggested to aid identifying the approved company's involvement.
4. Work is to be performed and completed in a well organized and timely fashion.
5. Commitments for starting and completing dates will be met. Circumstances beyond the control of the service company's personnel effecting time commitments should be communicated to the director of facilities to determine the correct course of action.
6. Procedures and production methods are to be used to demonstrate commitment to the efficient completion of the project which will allow the school to re-open on the scheduled date of Monday, April 24, 1995.
7. Precautions to be used to protect the customer's property from damage.
8. Maintain a safe working environment for school personnel, vendors and employees.

9. Complete all contracted work specified on the damage scope sheet to professional standards.
10. The Director of Facilities will inspect and approve satisfactory completion of the work on the project.

The procedures to be utilized on this project are designed to return the property exposed to the furnace soot back to pre-loss condition. The scope of repairs does not allow for betterment of the property and pre-loss or non-loss related damage is not included in the scope of repairs. Any cleaning, repair or replacement of a pre-loss or non-loss item is the financial responsibility of the School System and will require a separate scope of work.

PRICE BASIS

The estimate is based on fair and acceptable unit pricing in this geographical area. Factors affecting the prices are:

1. The intensity of smoke residue: light, medium or heavy coverage of the contaminate.
2. Degree of difficulty of the work to be performed.
3. Training, education and level of experience of the personnel required to perform the specific task.
4. The type of equipment and agents required to perform the task.
5. Availability and quality of a particular building material or supply.
6. Special care that may be required due to the high value of the content item.

Material prices used in this estimate are based on recent pricing and availability of products including federal taxes and shipping costs. The costs include all materials and supplies to be used on the job. A normal waste factor is used where applicable.

Wage rates are based on the average rate paid in this geographical area for each trade, including base wage, fringe benefits, employer taxes, worker's compensation, etc. Overtime hours may be needed to guarantee completion of the project on agreed date.

CONCLUSION

As a result of my inspection and testing procedures, I determined the degree of furnace soot in the building including the structural components to be of medium quantities. The furnace room was heavily contaminated where the fire originated. As the distance increased away from the furnace, the smoke residue became less intense.

I recommend emergency services to begin on this property immediately to prevent further damages, mitigate the loss, and prevent escalated cost of repairs. Pre-washing structural materials and the contents will prevent further damage to the materials caused by the acid nature of the smoke residue.

The method of estimating this project is "unit cost pricing" which includes individually itemizing each item for repair. Unit cost prices are then used to calculate a cost for each item on the list. Unit cost prices are based on the average rate paid in this geographical area for each trade, including base wage, fringe benefits, employer taxes, worker's compensation and cost of materials. Cleaning items also include the cost of normal business overhead, estimating cost and supervision. Structure repair items such as painting and carpentry do not include overhead or profit in the unit prices and will be added to the final total for these items.

On the basis of my inspection and professional opinion, the projected scope details the specifications and prices required to return the structure and listed contents to pre-loss condition. The total estimated amount of the scope of work is \$
Reference, "specifications and prices" section.

The scope of damages reflects only visible damage at the time of the initial inspection. Any damage hidden due to the condition of the property or lack of accessibility at the time of inspection will be disclosed to all parties immediately. A supplemental estimate will be prepared and presented for approval when warranted by additional work.

OVERLEAF
EXHAUST
AREA

NON-MECHANICAL
THAT THE WALL
DUCT

HIGH SCHOOL
FLOOR LAY OUT

