

THE HUMAN FACTOR OF PROPERTY CONSERVATION

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1.0 SCOPE

This data sheet defines the concept and benefits of property conservation, outlines its components, and offers recommendations on how to set up and maintain an effective property conservation program. It also provides subject matter related to the human factor relative to property conservation. Its intent is to highlight those activities in which the human factor is most likely to impact on the frequency and/or severity of loss to property and/or business interruption. Documented losses are the basis for the highlighted areas.

1.1 Changes

April 2019. Interim revision. Fire prevention inspection information was relocated from Data Sheet 2-81, *Fire Protection System Inspection, Testing, and Maintenance*, to Section 2.2.2, Property Loss Fire Prevention Inspections.

1.2 Superseded Information

Data Sheet 9-7/17-5, *Property Conservation*, has been incorporated into this document and withdrawn.

2.0 LOSS PREVENTION RECOMMENDATIONS

2.1 Human Factor

2.1.1 Introduction

2.1.1.1 Establish and maintain a property conservation program.

2.1.1.2 Include the following elements in the property conservation program: a written policy, an individual in charge, an emergency response team (ERT), education and training of employees, and a periodic review of the program.

2.1.2 State the Policy in Writing

A. Make it clear in writing that a property conservation program will be organized for the purpose of protecting business assets, especially physical property, from the threat of accidental loss, and key equipment from breakdowns due to poor care or improper operation.

B. Include specific objectives and express management's concern and strong support for the program. Express expectations for care and upkeep of equipment, as well as physical property. The policy serves as a reminder and as a reference guide. (See sample policy statement in Figure 1)

SAMPLE POLICY STATEMENT

_____ Company is actively committed to the prevention of property losses.

To promote this principle, _____ Company will

- purchase the proper equipment to prevent and/or control losses of all types.
- set up an emergency organization and establish planned emergency procedures.
- instruct employees at all levels and others working at _____ facilities on loss prevention practices through training courses, films and literature.

Supervisors are responsible for property conservation in the areas under their supervision. They are responsible for the care and upkeep of equipment and for the supervision of a trained emergency organization.

All employees are asked to make property conservation a priority as they perform their jobs.

Thank you for your cooperation. Without employee participation, no property conservation program can be successful. Everyone profits when properties remain in production.

President

Fig. 1. Sample policy statement

C. In developing the policy, recognize the need to minimize the negative impact and maximize the positive impact of the human factor in all facility operations. Address a wide range of human activities that are applicable to loss prevention. A list of human factor priority activities, based on actual losses, is given in Section 3.2). Once established, demonstrate senior management's commitment to managing the human factor of property conservation by inclusion into the written property conservation policy.

2.1.3 Establish Authority and Responsibility

Management has the sole responsibility for adopting complete policies, implementing effective procedures, and appointing properly trained and empowered individuals to provide daily supervision for each of the stated human activities. An on-going commitment from senior management to properly manage the property conservation program is essential for effective loss prevention results.

A. Assign loss control responsibility and delegate authority to individual members of the company's management team. Appoint one individual, who has direct access to the company's top policy-making authority, to be in charge of the program.

B. Survey the company's physical protection systems to verify their adequacy and/or to define where deficiencies exist. Audit equipment operation and maintenance procedures to assess maintenance quality and effectiveness and to monitor operator ability to act properly and promptly during start-up, shutdown, and emergencies.

C. Once a property conservation program has been set up, assign the following ongoing responsibilities to the individual in charge (or to delegated personnel at individual sites, such as plant managers):

1. Overall Supervision: Define functions, clarify responsibilities, and make sure all procedures are not only provided, but are properly carried out.
2. Planning: Anticipate area hazards and the exposure due to critical equipment failures or to changes in occupancy or operations. First, formulate plans and procedures for the prevention or reduction of hazards and equipment failures for the overall benefit of the facility. Second, plan the responses to be made in case a peril or equipment accident should threaten the company's assets or continued activity.
3. Education and Training: Ensure that employees and others working at the facilities are thoroughly trained in loss prevention and loss reduction principles. Make sure that all production processes and service operations are designed and carried out effectively. Operators must be trained to properly react to emergencies. Require contractors to follow established procedures according to company regulations.
4. Assignment: Delegate specific maintenance, supervision of fire protection equipment and systems and emergency response duties to key employees on each shift. Assign alternates to each key position. Provide operating and maintenance procedures, and make sure they are available, understood and used consistently.
5. Coordination: Maintain liaison with all corporate departments and appropriate outside organizations, including:
 - production and engineering
 - plant engineering and maintenance
 - finance and accounting
 - purchasing/contractors
 - public fire department and insurance company

2.1.3 Organize to Handle Emergencies

A. Form and train an emergency response team (ERT) to enable the company to cope with any property-threatening emergency at all times. Train the operators of key production equipment in emergency shut-down procedures appropriate to each unit.

B. Appoint one employee on each shift as the person in charge of the EO. Ensure this employee is familiar with the facility and its special hazards and equipment, as well as the location, care and operation of protection systems. Enable this person to take the lead in emergency situations.

C. Organize to handle emergencies by setting up corporate guidelines for property conservation/loss control practices. This includes pre-incident planning for natural disasters, and contingency planning for critical equipment breakdown, including spare part location.

D. Other emergency response team duties may include supervising hazardous operations such as cutting and welding. Procedures for preventive maintenance, operator training, and self inspections may also be predetermined and assigned to members of the EO.

2.1.4 Educate and Train

A. Educate and train members of management and other employees in the basics of physical property and equipment conservation. Involving everyone in some type of loss control builds an alert staff that recognizes the importance of and support given to the total program at all organizational levels. Informed workers can prevent or reduce costly production-stopping accidents by recognizing, reporting and appropriately reacting to emergency conditions.

B. Hold training drills and classroom sessions on a regular basis that address specific hazards, common operational pitfalls and key equipment exposures, or even focus on how a recent emergency was handled. Also review appropriate start-up, shutdown, and emergency procedures for key equipment.

Properly trained employees can have a positive effect on reducing the impact of a loss from an emergency situation. At the same time, however, people not effectively trained in the operation, maintenance, or emergency response of plant equipment, processes, or physical hazards in a facility, create the potential for

errors in judgement and action. The results from these improper human decisions can directly lead to the actual cause of an emergency incident or significantly exacerbate the situation. Inappropriate human activities oftentimes become an important factor in creating an environment for a property loss incident to develop. This can happen through improper operation of equipment, misunderstanding the hazards present, ineffective action to prevent or mitigate a developing emergency condition, improper maintenance of facilities/equipment and lack of planning for potential emergency conditions.

2.1.5 Audit and Update Periodically

Periodically review or audit the implementation of the recommendations in Sections 2.1.2, 2.1.3, and 2.1.4 to evaluate how effectively they are being carried out. Double-checking can provide insights into a property conservation program's progress. In addition, conditions may change, necessitating revisions in policy or procedures, or the need for additional training. For example, keep employee indoctrination programs up-to-date for training individuals new to the company or new to their positions.

2.2 Human Element

2.2.1 Managing Contractors

More and more facility functions are being outsourced to contractors. Additionally, there are fewer people on site to monitor and supervise the contractors. As a result, losses caused by or made more severe by the actions of contractors are increasing. Over the past 10 years, contractors have been responsible for 30% of the number of fires and 55% of the amount of fire loss.

2.2.1.1 Managing contractors involves the following basic steps:

- A. Reporting any changes in construction, occupancy, protection, or exposure, especially those involving contractors, to FM well ahead of time so FM can work with the contractors and ensure a proper and safe installation.
- B. Ensure all contractors are thoroughly briefed on company policies and procedures before working on site.
- C. Ensure contractors have, at the very least, provisions for:
 - 1. No subcontracting without owner approval.
 - 2. Holding owner harmless from loss resulting from contractor negligence.
 - 3. Contractor casualty insurance.
 - 4. Right of owner to inspect the work at any time.
 - 5. Contractor following all company policies and procedures.
- D. Log all contractors in at a central location.
- E. Assign a knowledgeable employee to every job to oversee the contractor's work for quality and their adherence to company procedures.

2.2.2 Property Loss Fire Prevention Inspections

Make regular inspections covering vital aspects of fire prevention. Tailor the inspection report to the individual facility, including only those items that would apply. Provide a space on the report to record details of deficiencies and any special hazard conditions. Include a space on the form for the inspector's signature and that of management responsible for taking action to correct any deficiencies. Correct those deficiencies that can be quickly remedied (e.g., blocked fire doors) during the inspection. Record these deficiencies as a reminder for preventive action.

2.2.2.1 Weekly Fire Prevention Inspections

Complete the following items, where applicable, during a weekly fire prevention inspection (See Appendix C, Fire Protection Inspection Form):

- 1. Ensure all fire protection systems are in service.
- 2. Inspect for changes in occupancy that have increased the fire hazard.

3. Inspect fire doors and indicate if found in good order. Ensure the door can move freely and exercise it if possible. Report any doors that are blocked open or inoperative.
4. Record the sprinkler system water pressure. Check to see that it is consistent on the various pressure gauges, allowing for check valves and excess pressure pumps.
5. Sprinkler inspection: a) needed or disconnected; b) obstructed by high-piled storage; c) signs of leakage; d) pipe hanger missing or damaged, or e) located near broken windows or open doors that may permit freezing.
6. Check general housekeeping conditions and report deficiencies. Note separately conditions in: a) storage areas; b) painting or other ignitable liquid areas; c) combustible dust, oil or lint deposits on ceilings, structural members or machines; and d) other areas, including yard storage.
7. Check ignitable liquid storage and handling areas for: a) use of safety cans where needed; b) excessive storage in manufacturing areas; c) obstructed drainage facilities; and d) use of ventilation fans, automatic closing faucets, safety bungs and grounding straps where needed.
8. Report violations of smoking regulations.
9. For Hot Work operations, provide space to report if permits are being used where required and whether the listed precautions are being taken.
10. Report any defects noted in electrical equipment.
11. Report storage that blocks aisles or fire protection equipment, or is too near heaters or lights.
12. Inspect inside hose stations to ensure that all equipment is in place and in good condition. Repair hose racks or reels that show signs of mechanical damage.
13. Report excessive accumulation of waste material.
14. Report any accumulations of snow, water, dirt or other materials on roofs or floors that could lead to overloading or collapse.
15. Report any leaks or other indications that roof needs repair.

2.2.2.2 Other Regular Inspections

1. Check nozzle angles of directional water spray and special hazard protection systems annually. Also, remove, clean or replace system and nozzle strainers, if provided.
2. Annually test fire detection systems (heat and smoke) as outlined in Data Sheet 5-48, *Automatic Fire Detectors*.
3. Maintain, inspect and test portable fire extinguishers at intervals recommended in Data Sheet 4-5, *Portable Extinguishers*.
4. Trip test fire doors and lubricate moving parts annually.
5. Inspect and flow yard hydrants annually and pressure test fire hose as outlined in Data Sheet 3-10, *Installation and Maintenance of Private Fire Service Mains and Their Appurtenances*.

3.0 SUPPORT FOR RECOMMENDATIONS

3.1 Concept and Benefits

A property conservation program places a strong emphasis on the human side of property protection and recognizes that human element failure is a primary factor in most large losses. Physical protection alone will not prevent or reduce all losses.

Successful property conservation practices become ingrained at every level of a company, beginning with top management. If management fails to take the lead in promoting loss prevention, all employee levels will fail, and a company's assets will be at stake. Even with the best property insurance coverage, a major accidental loss can mean economic ruin for an otherwise well-managed company. A company's most vital assets include the following:

- **Employees:** The most important asset of any successful business. Keeping a company in production provides job security, which promotes good employee relations.
- **Buildings, equipment, stock and supplies:** The basic assets seen on any corporate balance sheet. Without these, no profit-making capability exists.
- **Reputation/community relations:** When a major loss occurs, or when a facility is shut down, unemployment rises and tax revenues drop.
- **Stockholders:** Provide the money behind business. They look for a return on their investment through sound business management.
- **Profit:** The bottom line. Profits are a major indicator of how well a company is doing.

These assets can be preserved through an active property conservation program built into the total working atmosphere. Simply stated, "Property conservation is good business."

3.2 Priority Activities of the Human Factor

- Management Commitment to Property Conservation
- Pre-Incident Planning
- Emergency Response including Hazardous Materials
- Hot Work Management
- Managing Outside Contractors
- Loss Prevention and Control Inspections and Testing
- Equipment and Building Maintenance and Safety Control Testing
- Housekeeping and Storage Practices
- Equipment Operator Training
- Fire Protection Impairment Management
- Ignition Source Control
- Process Safety Management
- Property Supervision
- Managing Change
- Contingency Planning and Disaster Recovery
- Equipment Operator Training Including Cranes and Lift Trucks

4.0 REFERENCES

4.1 FM

Data Sheet 9-0/17-0, *Maintenance*, provides further guidance for machinery and equipment maintenance programs.

APPENDIX A GLOSSARY OF TERMS

Human factor: The human factor is the action or inaction that people introduce that directly impacts on the probability for a property loss incident to occur and/or affects the level of severity that an incident reaches. It can be a positive or negative factor. The hazard of the human factor is directly proportional to the physical hazards and processes present within a facility and inversely proportional to the level of preplanning, education and training provided for individuals in advance of the incident.

Property conservation: A management philosophy that is instilled in all employees to prevent losses or to minimize the frequency and severity of accidental losses. It is a combination of ensuring the necessary

physical protection and the proper employee responses to preserve a company's human and physical assets. These assets can be threatened by perils such as fire, wind, collapse, flood, earthquake, explosion, theft, and/or equipment breakdown.

APPENDIX B DOCUMENT REVISION HISTORY

April 2019. Interim revision. Fire prevention inspection information was relocated from Data Sheet 2-81, *Fire Protection System Inspection, Testing, and Maintenance*, to Section 2.2.2, Property Loss Fire Prevention Inspections.

January 2017. Data Sheet 9-7/17-5, *Property Conservation*, has been incorporated into this document.

January 2001. This document was first published.

APPENDIX C FIRE PROTECTION INSPECTION FORM

FIRE PROTECTION INSPECTION FORM



Account Number:

Index Number:

Sample Only	No one form can be designed to fit all conditions. Use this sample as a basic guide in developing your own form. Items that do not apply can be omitted; other items can be expanded or added as desired. For assistance, consult the next FM Global engineer who visits your facility, as well as reference FM Global Data Sheet 2-81, "Fire Protection System Inspection, Testing and Maintenance and other Fire Loss Prevention Inspections."					
Instructions to Inspector:	Fill out this form while inspecting fire protection. Send the completed form to your supervisor for necessary action. The report should be held for review by the next FM Global engineer who visits your facility.					
FACILITY:		LOCATION:		DATE:		
VALVE INSPECTIONS Visually inspect all locked valves weekly and physically try them monthly as required*. Record both weekly and monthly inspections.						
<p>*Physically try gate valves, including non-indicating and indicator-post-gate valves. FM Approved post-indicator-valve assemblies (PIVAs), indicating-butterfly valves (IBVs) and standard outside-screw-and-yoke (OS&Y) valves do not have to be tried, but should be checked visually at close range.</p> <p>All inside and outside valves controlling sprinklers or fire-protection water supplies are listed below. Check the condition of the valve. Do not report a valve open unless you have personally inspected it.</p>						
	VALVE LOCATION	AREA CONTROLLED	OPEN	SHUT	LOCKED	PHYSICALLY TURNED
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
<p>The FM Global Red Tag Permit System is used to guard against delayed reopening of valves. The Red Tag Permit should be used every time a sprinkler control valve is closed. When the valve is reopened, the 2-in. (51-mm) drain should be flowed wide-open to ensure there is no obstruction in the piping. The valve then should be relocked.</p>						
Were any valves closed since the last inspection?			<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Were FM Global Red Tag Permits used?			<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Was the valve(s) reopened fully and a 2-in. (51-mm) drain test conducted before the valve(s) was relocked?			<input type="checkbox"/> Yes	<input type="checkbox"/> No		
COMMENTS:						

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INSPECT THESE ITEMS AT LEAST WEEKLY													
SPRINKLERS	Automatic Sprinklers	SPARE HEADS AVAILABLE? <input type="checkbox"/> YES <input type="checkbox"/> NO				OBSTRUCTED BY HIGH PILING (18 to 36-in. [46 to 91-cm] clearance)? <input type="checkbox"/> YES <input type="checkbox"/> NO							
		HEAT ADEQUATE TO PREVENT FREEZING (40 F [4 C] min.)? (Note broken windows, etc.) MIN. TEMP.				WATER PRESSURE		PSI AT YARD LEVEL:					
		ANY HEADS DISCONNECTED OR NEEDED:				COMMENTS:							
DRY-PIPE VALVES	Valve Room Properly Heated?	No. 1	Min.: 42 F/6 C	Measured: F/C	No. 2	Min.: 42 F/6 C	Measured: F/C	No. 3	Min.: 42 F/6 C	Measured: F/C	No. 4	Min.: 42 F/6 C	Measured: F/C
	Air Pressure	No. 1	Min.: psi/bar	Measured: psi/bar	No. 2	Min.: psi/bar	Measured: psi/bar	No. 3	Min.: psi/bar	Measured: psi/bar	No. 4	Min.: psi/bar	Measured: psi/bar
WATER SUPPLIES	Fire Pump	FIRE PUMP PRESSURE: START STOP				PACKINGS COOL? <input type="checkbox"/> YES <input type="checkbox"/> NO							
		JOCKEY PUMP PRESSURE: START STOP				FUEL TANK LEVEL (3/4 min.)							
		PUMP ROOM PROPERLY HEATED? (F/C min.) TEMP. F/C		PROPERLY VENTILATED? <input type="checkbox"/> YES <input type="checkbox"/> NO		FIRE PUMP STARTED ON AUTOMATIC? <input type="checkbox"/> YES <input type="checkbox"/> NO							
	Tank Or Reservoir	FULL? <input type="checkbox"/> YES <input type="checkbox"/> NO		TIME TO OVERFLOW TANK: Mins.		HEATING SYSTEM IN USE? <input type="checkbox"/> YES <input type="checkbox"/> NO							
		TEMP. AT COLD WATER RETURN (should be 42 F [6 C] min.):				CIRCULATION GOOD? <input type="checkbox"/> YES <input type="checkbox"/> NO							
Inside Hose	IN GOOD CONDITION? <input type="checkbox"/> YES <input type="checkbox"/> NO				ACCESSIBLE? <input type="checkbox"/> YES <input type="checkbox"/> NO								
Fire Doors		CONDITION:		CLOSE PROPERLY? <input type="checkbox"/> YES <input type="checkbox"/> NO		OBSTRUCTED? <input type="checkbox"/> YES <input type="checkbox"/> NO		BLOCKED OPEN? <input type="checkbox"/> YES <input type="checkbox"/> NO					
OCCUPANCY	General Order Neatness	GOOD? <input type="checkbox"/> YES <input type="checkbox"/> NO		COMBUSTIBLE WASTE REMOVED ON SCHEDULE? <input type="checkbox"/> YES <input type="checkbox"/> NO		HOW OFTEN?							
		PRESENCE OF COMBUSTIBLE DUST, LINT OR OIL DEPOSITS ON CEILINGS, BEAMS, MACHINES? <input type="checkbox"/> YES <input type="checkbox"/> NO If yes, arrange for cleaning and investigate the source.				LIST AREAS NEEDING ATTENTION, INCLUDING YARD:							
	Electrical Equipment	DEFECTS NOTED? <input type="checkbox"/> YES <input type="checkbox"/> NO											
	Flammable Liquids	SAFETY CANS USED? <input type="checkbox"/> YES <input type="checkbox"/> NO		LOW LEVEL VENT FANS ON? <input type="checkbox"/> YES <input type="checkbox"/> NO		FLAMMABLE LIQUID CABINETS USED? <input type="checkbox"/> YES <input type="checkbox"/> NO		GROUNDING STRAPS, SELF-CLOSING FAUCETS AND SAFETY BUNS IN USE? <input type="checkbox"/> YES <input type="checkbox"/> NO					
	Smoking Regulations	LOCATIONS WHERE VIOLATIONS NOTED:				CORRECTIVE ACTION TAKEN:							
	Hot Work	PERMITS ISSUED FOR ALL HOT WORK APPLICATIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO				LISTED PRECAUTIONS TAKEN? <input type="checkbox"/> YES <input type="checkbox"/> NO							
	Storage	WELL-ARRANGED? <input type="checkbox"/> YES <input type="checkbox"/> NO		AISLES CLEAR? <input type="checkbox"/> YES <input type="checkbox"/> NO		CLEAR OF LAMPS, HEATERS (36 in. [91 cm] min.)? <input type="checkbox"/> YES <input type="checkbox"/> NO							
OTHER ITEMS:													
INSPECT THESE ITEMS AT LEAST MONTHLY													
MANUAL PROTECTION	Extinguishers	CHARGED? <input type="checkbox"/> YES <input type="checkbox"/> NO		ANY MISSING? <input type="checkbox"/> YES <input type="checkbox"/> NO		ACCESSIBLE? <input type="checkbox"/> YES <input type="checkbox"/> NO		LOCATION OF EXTINGUISHERS NEEDING ATTENTION:					
	Yard Hydrants and Hose	CONDITION: NO. 1		NO. 3		NO. 5		NO. 7					
		NO. 2		NO. 4		NO. 6							
		HYDRANTS DRAINED? <input type="checkbox"/> YES <input type="checkbox"/> NO		REMARKS:									
OTHER ITEMS:													
INSPECT THESE ITEMS AT LEAST QUARTERLY													
Sprinkler Alarms		TESTED? <input type="checkbox"/> YES <input type="checkbox"/> NO		TIME FOR ALARM		OPERATION SATISFACTORY? (If no, comment below.) <input type="checkbox"/> YES <input type="checkbox"/> NO							
OTHER ITEMS:													
INSPECTED BY:								DATE:					
REVIEWED BY:								TITLE:					
								DATE:					

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