COMMON EQUIPMENT FAILURES AND CAUSES

How breakdowns can impact the bottom line. A handy reference guide from Hartford Steam Boiler.
A WORLD THAT DEPENDS ON EQUIPMENT.

Businesses, institutions and municipalities are acquiring and increasingly relying on costly equipment and new technologies. Whether it’s electrical supply and distribution, environmental controls, refrigeration or computer systems, equipment is vital in today’s world.

Reliance on new technologies and equipment has actually led to a greater probability that a business-critical system will fail.

Understanding what can go wrong with equipment is key to preventing losses and protecting the bottom line.

INSURANCE THAT PROTECTS EQUIPMENT AND YOUR BOTTOM LINE.

Equipment is exposed to unique risks that other property is not, such as electrical short circuits and mechanical forces. Unbudgeted losses from a breakdown can be extremely costly and, in many cases, greatly impact the bottom line. Equipment breakdown coverage is needed to pay for the financial loss incurred as a consequence of a breakdown.

INSURANCE THAT PROTECTS THE HEART OF YOUR BUSINESS.

Equipment breakdown coverage protects the heart of your business – the equipment, machinery and systems that run your business. Equipment breakdown insurance pays for damage caused by:

- Electrical malfunction
- Mechanical breakdown
- Power surges
- Centrifugal force
- And more

Electrical equipment

The loss of power can mean the loss of income and customers. Since the panels, circuit breakers and cables in an electrical system are all interconnected, a short circuit in one part can spread to other parts of the system. The cause can be:

- Loose connections
- Dust
- Moisture or high humidity
- Supply line surges
- Insulation deterioration
- Overload conditions

Electrical system breakdowns are a leading cause of equipment and business interruption losses. It’s a growing problem and the losses can be substantial – electrical systems constitute a major percentage of a property’s total value.

Typical losses

**Office building** – Electrical arcing destroyed three main electrical panels and left an office building without power. Temporary measures were taken to restore power to tenants – particularly to an accounting firm that was in the height of its tax season crunch.

<table>
<thead>
<tr>
<th>Description: Office building</th>
<th>Repair cost</th>
<th>Business interruption</th>
<th>Total loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical arcing</td>
<td>$118,681</td>
<td>$14,600</td>
<td>$133,281</td>
</tr>
<tr>
<td>Total loss</td>
<td>$153,281</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Apartment building**

An apartment complex’s aluminum electrical supply bus burned out, severely damaging electrical wires and cables. Angry residents had to be relocated.

<table>
<thead>
<tr>
<th>Description: Apartment building</th>
<th>Equipment repair cost</th>
<th>Relocation cost</th>
<th>Total loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity failure</td>
<td>$118,681</td>
<td>$72,152</td>
<td>$190,833</td>
</tr>
<tr>
<td>Total loss</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Furniture manufacturer** – Sawdust in an electrical distribution panel severely damaged the interior of the panel. Overtime was required to make up lost production.

<table>
<thead>
<tr>
<th>Description: Furniture manufacturer</th>
<th>Repair cost</th>
<th>Business interruption</th>
<th>Total loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawdust in electrical panel</td>
<td>$21,087</td>
<td>$14,600</td>
<td>$35,687</td>
</tr>
<tr>
<td>Total loss</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mechanical equipment**

Buildings are loaded with mechanical equipment that contains sophisticated, sensitive technology. Elevators, heating and cooling systems, and security systems are all heavily used, in some cases around the clock, making them even more prone to breakdown. Common causes are:

- Oil contamination
- Misalignment
- Metal fatigue
- Operator error
- Electrical disturbances
- Vibration
- Foreign material

Mechanical equipment breakdown can significantly impact a business. A breakdown can cost thousands in repair bills, business interruption and lost income.

Typical losses

**Hospital** – A turbine generator supplying power to a hospital failed when blades broke and penetrated the engine.

<table>
<thead>
<tr>
<th>Description: Hospital</th>
<th>Repair cost</th>
<th>Business interruption</th>
<th>Total loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbine generator</td>
<td>$292,513</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total loss</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ABOUT HSB AND MUNICH RE

HSB is proud to be part of Munich Re. Munich Re stands for exceptional risk solutions, consistent risk management, financial stability and client proximity. Munich Re – which pursues an integrated business model consisting of insurance and reinsurance – is one of the world’s leading reinsurers.

HSB is a leading specialty insurer providing equipment breakdown, other specialty coverages, inspection services and engineering-based risk management that set the standard for excellence worldwide. We anticipate risks and provide forward-thinking solutions that render tomorrow’s world insurable.
Printer - A bolt came loose and fell into a high-speed press, damaging the cylinder and gears.

Total loss $136,693

Machine shop - A power surge from a utility line damaged two computer circuit boards, halting a metal shearing operation for nearly a week. Materials and workers were sent to another plant several hundred miles away to meet production requirements.

<table>
<thead>
<tr>
<th>Repair cost</th>
<th>$9,485</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra expense</td>
<td>$42,541</td>
</tr>
<tr>
<td>Total loss</td>
<td>$52,026</td>
</tr>
</tbody>
</table>

Air conditioning and refrigeration systems

An air conditioning or refrigeration breakdown can result in business interruption that may far exceed the property damage loss. Dependence on refrigeration increases the likelihood of loss due to spoilage. Common causes of these breakdowns include:

- Control failure
- Vibration
- Lack of lubrication
- Scale build-up
- Rapid weather change

Compressors, which are particularly prone to breakdown, can cost $10,000 to $20,000 or more, and replacement refrigerant can total in the thousands.

Typical losses

Apartment building - An air conditioning motor burned out in a high-rise, senior citizens' apartment building. Ninety-plus degree temperatures necessitated setting up four rented “spot coolers.” Overtime was required to get the motor back on line.

<table>
<thead>
<tr>
<th>Property damages</th>
<th>$83,557</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra expenses</td>
<td>$16,794</td>
</tr>
<tr>
<td>Total loss</td>
<td>$100,351</td>
</tr>
</tbody>
</table>

Food processor - An ammonia line ruptured when a compressor crankshaft and its connecting rod broke. Fresh scallops were contaminated with ammonia. Rental units were needed while the new compressor was installed.

| Total loss       | $65,289 |

Medical clinic - A control failed on a medical clinic’s refrigerator, causing the temperature to dive into the single-digits. Drugs, normally stored between 36° to 43° degrees, had to be discarded.

| Total loss       | $21,953 |

Boilers and pressure vessels

Boilers are commonly used to generate and distribute heat. Cookers, sterilizers and vulcanizers also use boilers. This equipment is vulnerable to breakdown due to:

- Pump failure
- Low water cut-off mechanism failure
- Control failure
- Scale build-up
- Inadequate controls of safety devices

The effect that a boiler or pressure vessel breakdown can have on an operation should not be underestimated. Repair costs can soar and lack of heat or hot water can shut down a facility.

Typical losses

School - Sediment in a boiler caused a low-water condition that resulted in severe over-firing, shutting down the boiler and the whole school. A rental unit was needed until the damaged boiler could be replaced.

<table>
<thead>
<tr>
<th>Property damages</th>
<th>$98,500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra expense</td>
<td>$25,164</td>
</tr>
<tr>
<td>Total loss</td>
<td>$123,664</td>
</tr>
</tbody>
</table>

Manufacturer - A faulty circuit in a water pump caused a fire tube boiler to dry fire. The boiler was severely damaged.

| Total loss       | $90,600 |

Church - A section of a boiler and a steam pipe fitting cracked. Steam damaged the church organ, choir robes and public address system.

| Total loss       | $34,969 |
Business equipment and systems

Computers, faxes, PBX phone systems and communications equipment all rely on sensitive electronic technology that is prone to breakdown. This equipment is particularly susceptible to damage from:

- Power surges
- Power interruptions
- Electrical line surges
- Insulation deterioration
- Overload conditions
- Separation of assembled parts

Business equipment breakdown can shut an operation down and result in lost income and large repair or replacement bills.

Typical losses

**Municipal building** – A power surge damaged a generator and burned out police radio equipment, printed circuit boards for a fire alarm system, a small transformer and small electric motors.

| Total Loss | $90,160 |

**Office building** – Electrical power supply voltage fluctuation caused two telephone system terminal boards to burn out.

| Total Loss | $52,500 |

**Service station** – A power surge damaged a service station’s electronics, including the computerized diagnostic system, telephone, paging system and the security system.

| Total Loss | $33,388 |

Insurance that pays for more than just a repair.

Equipment breakdown insurance offers protection from the costs associated with insured losses to a facility’s equipment. It pays for:

- Direct property loss – the cost to repair or replace the damaged equipment
- Extra expense losses when a breakdown causes business interruption
- Other expenses incurred to limit the loss or speed business restoration
- The loss value of spoiled products or materials.

Equipment breakdown insurance covers the physical damage – and the financial damage – stemming from equipment failure. It’s the bottom-line protection essential for today’s equipment-intensive world.

More than protection – prevention.

At Hartford Steam Boiler, we believe that helping customers prevent costly losses and business interruption is the best kind of insurance. In fact, the company was founded on that principle. Today, HSB owns and updates one of the world’s largest databases on equipment breakdown and its causes. Here are just a few of the loss prevention services we offer:

- Inspection hotline – request a jurisdictional inspection for a boiler or pressure vessel or get an answer to a technical question.

Call 1-800-333-4677
Fax 1-484-582-1815, or e-mail NSCINSP_HOTLINE@hsb.com.

- Infrared thermography – to help identify potential problems in your electrical system.