bharti AXA

redefining / general insurance

IN-SIGHT

A QUATERLY LOSS PREVENTION DIGEST

Volume 1. February 2011

Contents

Amarnath Ananthanarayanan
MD & CEO – Bharti AXA General Insurance Company Limited, Bangalore

Message from CEO

I am very happy to note that our risk engineering team is bringing out a quarterly newsletter through which they intend to disseminate safety and loss prevention related information with our customers, prospects and business associates. Commercial insurance the world over in general and in India in particular is going through extremely difficult times due to the cyclical nature of insurance business and the de-tariffing of Insurance business in India. These tough times though pose a challenge to all insurers does nevertheless provide opportunities to the committed ones to build long term relationships. This is Bharti AXA's way of looking at insurance business and in keeping with our core values and stated objectives of providing value to our customers beyond providing insurance solutions this new initiative of ours becomes one more step in this direction.

I wish this new initiative a great success and hope this would be of use and help to our customers and business associates.

Amarnath Ananthanarayanan

Message from COO

A technical newsletter on safety and loss prevention can be of immense value to the manufacturing and service industry as it provides for an easy and wide sharing of safety and loss prevention related information of a wide cross section of industries. I hence welcome this new venture from our risk engineering team.

The focus of the majority of literature on safety and loss prevention has been on large or hazardous industries with very little focus on the SME segment. The inaugural and subsequent newsletters this year I understand would focus on the SME segment. With specialist loss prevention experts having nearly three decades of experience sharing their views and information on this subject this initiative is bound to be of great value to our customers and prospects. I wish this new venture a great success and look forward to the various issues that they would be bringing out during the course of this year.

Kimsoon Chua
COO – Bharti AXA General Insurance Company Limited, Bangalore

From the Editor's Desk

At the outset I would like to thank our risk engineering team and other colleagues at Bharti AXA General Insurance Company Limited for their support in bringing out this newsletter. This newsletter focusing primarily on Safety and Loss Prevention issues would henceforth be brought out as a quarterly issue.

The focus this year would be on the SME industrial segment and we begin this series by starting off with the engineering industries. Engineering industries are broadly classified as Heavy and Light engineering segments and the focus of this issue would be on the light engineering segment where we would be covering loss prevention measures applicable to all types of industries in this segment. The issues that follow would thereafter focus on specific hazards associated with various types of processes being carried out in different engineering industries in this segment. We sincerely believe that the information given here will help our readers in improving their safety and loss prevention practices and thereby make their industries a safer place to work.

Balaji Cuddapah
Sr. Vice President, Commercial Lines Underwriting and Risk Engineering

Loss Prevention in Light Engineering Industries

Engineering Industries are presumably low hazard occupancies from the fire hazard point of view. Some statistics that are given here does also illustrate this fact. An analysis of all major fires (loss value more than Rs. 1.75 crores) that occurred in U.K for a 1 year period between December 2008 and November 2009 reveals that the incidence of fire in an engineering industry was as low as 0.04% (1 out of the 24 major fires that took place during this period) and that the loss severity in this incident was around Rs. 2.45 crores. Additionally an analysis of information compiled from GIC annual reports during a nine year period between 1985 and 1993 of 656 major losses that resulted in an aggregate loss of about Rs. 599.47 crores reveal that engineering industries accounted for 85 of these losses (12.95%) resulting in a claim settlement of around 101.31 crores (16.90%). Though low in terms of hazard fires nevertheless do occur in engineering industries and it would augur well from the risk management point of view to evaluate the hazards in this type of industry and chalk out the necessary control measures.

Broadly engineering industries can be grouped into two segments – heavy engineering and light engineering industries. Since the processes and occupancies in these two segments are widely different evaluation of fire risks in each of these categories would have to be carried out separately. In this article we shall be dealing with light engineering industries. Light engineering industries is again a very diverse group having a number of distinctive sectors that include low-tech items like castings, forgings and fasteners, to the highly sophisticated microprocessors based processed control equipment and diagnostic medical instruments. This group also includes industries like bearings, steel pipes and tubes, etc. The products manufactured in light engineering industries are largely used as input to the capital goods industry. The approach towards loss prevention in dealing with such a distinctive range of industries would be to first outline the general hazards applicable to all types of industries in this group and then take a closer look at the various fire hazards associated with different processes that are carried out in this group of industries.

Fire Loss Prevention for general fire hazards in light engineering industries

For evaluating the general fire hazards in any industry we need to identify - the ignition sources, the combustible materials present, and the factors that contribute to fire spread. The control measures required to mitigate this hazard can then be outlined based on the above evaluation

Major Ignition sources

- Electric supply: Electrical faults generate a lot of energy that would be sufficient enough to ignite combustible material like waste, packing material etc. that are stored in close vicinity to electrical equipment and wiring. This fire can then spread to other areas in the premises. Though most of the products manufactured in engineering industries are not generally combustible, many of them get packed in combustible material like carton boxes and wooden crates.
- Hot work: This refers to activities that produce heat and/ or sparks like welding, cutting, grinding, brazing and the like where combustible material could get ignited by sparks / falling splatter.
- Smoking materials: Surreptitious smoking in no-smoking areas as well as unregulated smoking happens to be a potent source of ignition in all types of industries including light engineering industries
- Spontaneous Combustion: Some materials like coal and Direct Reduced Iron (Sponge Iron) are prone to spontaneous combustion and can get ignited on their own. Similar is the case with cotton waste contaminated with oil and grease.

- **Utilities:** Diesel generating sets, boilers and burners are heat generating sources which can initiate a fire hazard. This hazard gets accentuated when such utilities are located inside the process block or when situated adjoining to it.
- **Process:** There are a variety of processes like spray painting, heat treatment, and oil quenching, etc. that have inherent fire hazards associated with them and can hence result in a fire. Control measures for these hazards would be dealt with separately in future issues of this newsletter
- **Exposure Hazard:** Fire spread from neighbouring occupancy increases when it happens to be occupancy in a higher fire hazard category than the former and where spatial segregation between the units is inadequate. This hazard increases when combustible material gets stored adjoining to or in close proximity to the compound wall of a unit.

Presence of Combustible materials

- **Raw materials:** Bought out plastic and rubber components used in the making of the product are combustible by nature and would hence add to the fire load
- **Packing materials:** Though raw materials and finished goods per se may be non-combustible the chance for occurrence of a fire hazard increases when these material get packed in combustible packaging which includes – carton boxes, wooden crates, etc.
- **Waste Material:** Generation of combustible waste material is generally low in engineering industries. Nevertheless accumulation of waste packing materials used for packing machineries/ spares/ consumables or raw materials would be an area that requires attention with regard to its storage and quantities
- **Oils:** Hydraulic, lubrication, cutting oils and the like which are extensively used in machinery as well as stored in considerable quantities for future use can add fuel a fire.
- **Fuels & flammable materials:** LPG (Industrial cylinders/ bulk storages), HSD (fuel for diesel generating sets/ burners), Coal
- **Building Materials:** A common hazard that is generally seen in many industries is the use of thermocole (Polystyrene sheets) for false ceiling and the dangerous routing of bare wires and cables through them for providing supply to lights fittings. Polystyrene sheets are not merely combustible but can also contribute to a very rapid spread of fire.

Factors that aggravate the fire hazard

- **Plant Layout:** A single block where process and storages are combined under a single roof and utilities are located adjoining to or inside the process block gives rise to the greatest fire hazard both in terms of frequency and severity. Of these storages inside process blocks is the one that creates the highest fire hazard. An analysis of many major industrial fires reveals that most of the fires originate from storage areas and that this occurs mostly during non-occupancy hours. While the best layout features would necessitate having separate buildings away from process blocks for storing raw materials, finished goods and other general store items; the hazard gets mitigated to a lesser extent if storages are carried out in a separate room in the production block and provided with a master control switch for electric supply that is switched off during non-occupancy hours.
- **Machinery Layout:** Haphazard machinery layout without proper and demarcated aisle ways and storing of work in process materials in and around machinery contributes to increasing the fire hazard in terms of fire spread and severity. An undue increase of hazard is

seen when the quantity of oil (hydraulic, lubrication, etc.) in machinery within 6 metres of each other exceeds 2300 litres. In this regard it is worth noting that water based cutting oils besides being environment friendly reduces the fire load in the premises.

- Housekeeping: Bad housekeeping always increases the fire hazard by contributing to the growth and spread of fire. Also waste and scrap especially the combustible ones if not stored in a secured manner well away from process and storage blocks without being periodically disposed would increase the fire hazard. Measures should also be in place to deal with oil spills and clean up procedures for these.
- Safety Management: Lack of awareness regarding safety is a major issue in small and light hazard industries because they fall outside the purview of statutory regulation which makes this mandatory for large and hazardous industries. Safety Management issues in light engineering industries revolve around creating safety awareness amongst employees as also proper regulation of contract work. These issues do not get properly addressed in the absence of a safety officer or a designated person having additional responsibility for safety and/or a safety committee that meets atleast once in a quarter.
- Late detection of fire: Fires originating during non-occupancy hours are always detected late in the absence of automatic fire detection system and this results in increasing the severity of fire losses
- Fire Protection: Non-availability of Portable fire extinguishers, water that can be used for refilling fire tenders, trailer pumps, hydrant system and sprinklers are factors that hamper an industry's ability to deal with major fire emergencies. The situation does however get better if a public fire brigade is located within 5 KMs of the factory with no rail crossing enroute and road conditions are such that the tenders can reach the place within 20 minutes of a fire outbreak.

Flood & Wind Loss Prevention measures for Light Engineering Industries

Besides fire the other major physical hazards that need to be taken care of in light engineering industry would include wind and water damage. In India particular attention needs to be provided towards loss prevention issues of these risks especially before the commencement of the monsoon season. Water damage can arise as a result of inundation from overflowing water bodies, heavy rainfall, water entry through damaged roof or poorly maintained roof gutters draining into gutters through process areas coupled with inadequate drainage facilities. Wind damage to roofs can occur to those buildings having roofs carried out with AC or metal sheets. Recommended loss control measures for these risks are:

a) To avoid water entry through door openings of buildings having a low plinth height (less than 1 feet) provide sills of around 1 feet height enclosing the door opening
b) Adequately anchor and maintain all roof sheets to prevent collapse or blow off and subsequent water entry through these openings
c) Ensure that all roof gutters and drainage systems are cleaned prior to the commencement of the monsoon season
d) Replace all broken glass panes of windows and ventilators and ensure that windows and ventilators can be properly closed without any gaps or openings through which water can seep in
e) Provide skids under all floor stored stocks including sheet and coiled metal to prevent rusting and pitting that could arise due to water accumulation on floor
f) In the event of an imminent water entry inside the premises:
   i. Ensure that all valuable material and stocks are shifted to a higher floor level / a safer outside location / stored in a place well above the floor level
   ii. Disconnect electric supply and electric drives of machines/ pumps at floor level
   iii. Transfer quenching oil in pits to safer storages in barrels or tanks

Based on the above analysis we list below the 10 commandments for loss prevention in light engineering industries

Ten Loss Prevention Commandments for Light Engineering Industries

1. Electrical installations – Ensure all wiring is carried out using armoured cables/ heavy duty metal conduit pipes. Loose/ temporary wiring as also use of wooden switchboards, wire fuses and non-industrial light fittings needs to be avoided. Potentially hazardous areas like spray painting booths and LPG storage locations should be provided with flame proof electrical equipment and wiring.
2. Work Permit System – Have in place a 'Hot Work Permit' system to regulate cutting and welding jobs that give rise to heat and sparks. Alternately ensure that all such works are carried out in a separate shed/ location earmarked for such activity and located well away from the process or storage blocks
3. Housekeeping – Adequate and demarcated aisle ways between machinery which are kept free of any storage and housekeeping standards that control oils and flammables (storage and spills) can reduce fire spread
4. Waste materials - Keep all rags, gunny bags, packing materials and wastes well away from ignition sources as these constitute a major fire hazard. Metal bins should be used for collection of cotton waste which should be periodically disposed off at predetermined intervals. Store all scrap and waste material well away from process and storage blocks and ensure that these are periodically disposed to prevent accumulation
5. Storage areas – Provide a master control switch at the entrance of the store/ storage area and ensure that the same is switched off during non-occupancy hours. Ensure that there are no storages within 1 metre of electrical wiring and equipment
6. Layout - Haphazard machinery layout without proper and demarcated aisle ways and storing of work in process materials in and around machinery contributes to increasing the fire hazard in terms of fire spread and severity.
7. Safety Management – Ensure that there is a person in charge of safety and also have in place an active safety committee
8. Water & Wind perils - Ensure that all roof gutters and drainage systems are cleaned prior to the commencement of the monsoon season and that the roof sheets are adequately anchored and maintained to prevent collapse or blow off as also subsequent water entry through these openings
9. Rusting and pitting - To prevent water damage to sheets and coiled metal provide skids under all floor-stored stocks
10. Low Plinth Level – In case plinth level of plant, storage or utility block is low enough to permit water entry during a potential flooding incident it is recommended that door openings of these buildings be provided with sills of atleast 1 feet height enclosing the door opening to prevent water entry

G. Sajiv

National Head – Risk Engineering

Safety Quiz

1 The type of extinguisher to be used for fire involving flammable liquids

a) Water type extinguisher
b) CO2 extinguisher
c) Foam type extinguisher

2 Type of extinguisher/s that are presently banned

a) Soda Acid type
b) Chemical Foam
c) both

3 Electrocution is caused on account of

a) Voltage
b) Current
c) Voltage or Current

4 Type of wiring recommended in warehouse and storage area

a) Any standard means of wiring other than open or loose wiring
b) Wiring inside heavy duty PVC or Metallic conduits
c) Wiring using armoured cables or heavy duty steel Conduits

5 Hot work refers to

a) Any work involving generation of heat and sparks like welding, cutting, grinding etc.
b) Work involving usage of blow lamp or gas flames
c) Work or process where temperatures in excess of 100°C are involved

6 Battery charging operations should preferably be carried out

a) Inside process or storage block
b) Outside process or storage blocks
c) In any well ventilated area indoors or outdoors

7 Waste cotton contaminated with oil and grease can get ignited due to

a) Spontaneous combustion
b) any ignition source arising from hot work, electrical faults, smoking materials, etc.
c) Either of the causes mentioned in a & b

8 The major ignition source for industrial fires

a) Electricity
b) Smoking materials
c) Hot work

9 Majority of the fires in industry originate from

a) Process areas
b) Storage areas
c) Utility areas

10 Enclosures where LPG is being stored should necessarily be provided with ventilators

a) At floor level
b) At roof level
c) Both at roof and floor level

Answers to the above

1	2	3	4	5	6	7	8	9	10
c	c	b	c	a	b	c	a	b	a

P. K. Roychowdhury

Zonal Manager – Risk Engineering

Loss Lessons

Date and time: 09th October 2010, 1730 hours

Occupancy: Engineering Workshop manufacturing storage equipments, racks and bins

Probable Cause: Malfunctioning of DG set resulting in a fire that spreads to storage/ process areas

Reported Loss: Around 2.0 crores

Premises: The manufacturing facility over here consists of two adjoining sheds one of which is occupied as a press shop and the other as fabrication shop. The press shop is of structural steel frame work having brick walls and AC sheet roofing. This shed is also provided with a mezzanine floor that is used mainly for storage of bought out materials which also includes rubber/ plastic components. At the rear of the press shop and adjoining to it is the fabrication shop having GI sheet roofing and GI sheet cladding. A DG set in an acoustic enclosure and a spray painting area cordoned with a plastic net are located side by side adjoining to both the press and fabrication shop. On the front side of the press shop there is an office building and a sand blasting booth.

Incident: On 9th October 2010 most of the workmen had left the premises after the close of working hours (1730 hours) with only those engaged in cleaning work being present near the fabrication block. A meeting was also taking place in the conference room where the Managing Director and staff were present. Since there was no grid supply the Diesel Generator was running. When lights inside the conference room went off around 1900 Hrs. the staff inside came out to enquire into the matter. Since they noticed flames emanating from the DG set area they immediately notified the Public Fire Brigade. Also those working in the fabrication area rushed to the DG set with portable fire extinguishers to fight the fire. Fire from DG set spread to the nearby wire net (plastic) enclosure that is used to cordon the spray painting area and from there to the press shop through the ventilators facing the spray painting area as fire fighting with extinguishers was not effective. Stocks such as the stationeries, carton boxes, gear boxes, axles, dies, castor wheels and paint tins stored in the mezzanine floor near to the ventilators caught fire and from here fire spread to the stocks stored on the floor of the building and also to the CNC punching machines over here. The first fire engine arrived at site at around 1920 Hrs. and the second engine at around 2000 Hrs. subsequently three more fire engines came and fire fighting continued till 2200 Hrs. when the fire was completely put off. The last fire engine left the site at around 2230 Hrs. Loss as per initial reports of insured is around 2.0 crores.

Probable Cause: The most probable cause of fire is believed to be a malfunctioning of the DG set located inside an acoustic enclosure resulting in a fire.

Loss Prevention Recommendations

1. Proper maintenance of DG sets after each of the prescribed number of running hours in line with manufacturer's recommendations is absolutely essential. In case in-house expertise is not available maintenance of DG sets could be outsourced preferably to the manufacturer.
2. Location of DG set near to spray painting area and adjoining to fabrication shop with ventilators open increases the fire hazard. It is hence recommended that the DG set be relocated such that it is atleast 6-20 meters away from all storage or process blocks/areas. In case this is absolutely not possible then the spray painting area would need to be shifted to an alternate location and all window and ventilator openings within 6 metre distance of the DG set should be provided with 6 mm thick wired glasses in steel framework.
3. Raw materials and finished goods should be stored in separate storages that are segregated from process areas like press shop. This issue needs special attention since many of the bought out raw material items made of rubber and plastic are combustible in nature.
4. Spray painting even if carried out occasionally should be done in a proper spray painting booth that is provided with water curtains and exhaust system.
5. Provision of combustible material like plastic nets around spray painting areas and in close vicinity to DG sets increases the fire hazard and needs to be definitely avoided.
6. A proper waste disposal system of segregating waste into categories such as hazardous, bio-degradable, plastics and metals and storing these items in separate bins or demarcated locations well away from process and storage blocks and disposing them as per applicable pollution control norms is recommended to improve fire safety

Loss Site Photographs

The DG set where the fire is first noticed

Location of the DG set and the Ventilators

Damaged plastic wheel in the mezzanine floor

Damaged roof above the mezzanine floor

N. Sivaraj
Regional Manager – Risk Engineering

Published by **Corporate Communications of Bharti AXA General Insurance** First Floor, The Ferns Icon, Survey No. 28, Next to Akme Ballet, Doddanekundi, Off Outer Ring Road, Bangalore - 560 037, India.

Chief Editor
Balaji Cuddapah
balaji.cuddapah@bharti-axagi.co.in

Sub Editor
Uma Maheswari
uma.maheswari@bharti-axagi.co.in