Loss and Damage Assessment in the Context of Fire Hazards: A Study on Selected Garment Factories in Bangladesh

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Abstract: This research paper has discussed comprehensively about the concept, classification, estimating methods and grading standards of economic losses of fire in garments industries in Bangladesh. The contents of economic losses of industrial fire include the losses of industrial resources" direct economic losses, indirect economic losses and the economic losses on ecological environment. Different estimating methods are adopted for each of them: And, according to the amount of economic losses, industrial fires are divided into extraordinarily serious industrial fire, serious industrial fire and ordinary industrial fire. Most of the fire hazards in RMG sector occurs causing electric short circuit in Bangladesh. And this occurrence creates huge economic damage and loss in this sector. In order to attach of the store house or go down with the factory it becomes impossible to out let of the goods from the store house which happens great loss. Distance of fire station is another reason to control of fire. Locked and narrow emergency exits, panic, dark stairway, full of smoke and the electricity supply been shut down and suffocation for the smoke are the main reasons for death and casualty in the garments factories in our country. Owner of the factory should give remarkably importance in electric supply line, wearing cables and electrical equipments. Government should take steps to operate mobile courts in factory level regularly to ensure occupational safety & health.

Keywords: Loss and Damage Assessment, Fire Hazards, Garment Factories, Bangladesh

1. Introduction

Bangladesh is one of the most disaster-prone countries in the world. The country has had several experiences of natural and human induced disasters. It is a low-lying deltaic country in South Asia and divided into three zones, namely hills, terraces and flood plain. The country has an approximate area of 147,570 sq.km bounded between 20°34' to 26°38'N latitude and 88°01' to 92°41'E longitude. Bangladesh being in close proximity with the Himalayas by the north and the Bay of Bengal by the south. Due to the geographical location, the country mainly the coastal area is more vulnerable which represents an area of 47,211 km2, 32 percent of the country's geographical area frequently suffers from devastating natural hazards. Since independence in 1971, Bangladesh has achieved substantial improvements in some social indicators like a decrease in infant and maternal mortality as well as illiteracy, and an increase in life expectancy, access to safe water and sanitation. The economic performance of the country has been relatively strong since 1990, with an annual 6.5% average GDP growth rate. In this context the of RMG sector is keeping contribution to improve our national economy remarkably.

Rebuilding the war-ravaged country of Bangladesh with limited resources appeared to be the biggest challenge for us after the independence in 1971. To progress the country's economy, industrialization may keep crucial contribution. Once upon a time our jute industries kept a vital role to enrich our national economy. When our lone export earner the jute industry started losing its golden days, it is the RMG sector that replaced it, and then, to overtake it. The readymade garment (RMG) industry which is now the single biggest export earner for Bangladesh. Bangladesh received more than three fourth (about 81.32%) of total export earnings from Readymade garments (Woven and Knitwear). Total export of Readymade Garments rose by 7.9 percent year-on-year in January-March 2015 and their growth significantly increased by 14.0 percentage points from the previous quarter, October-December 2014. (Bangladesh

Bank Quarterly Review on RMG: January-March 2015).

In Bangladesh there are 4222 garments factories and about 4 million employees engaged in RMG sector, 85 percent of which is women. According to BGMEA, 30 percent capacity of RMG sector is unutilized due to lack of skilled labor force. Since 2005 employment in RMG sector increases from 2 million to 4 million in FY 2014. As well as number of active factories increases from 4107 to 5600 in 2012-13. However, in 2013-14 the number of factories stood at 4222 (BGMEA. * Included in BGMEA Member List).

The apparel industry of Bangladesh started its journey in the 1980s and has come to the position it is in today. The late Nurool Quader Khan was the pioneer of the readymade garment industry in Bangladesh. He had a vision of how to transform the country. In 1978, he sent 130 trainees to South Korea where they learned how to produce readymade garments.

With those trainees, he set up the first factory – Desh Garments – to produce garments for export. At the same time, the late Akhter Mohammad Musa of Bond Garments, the late Mohammad Reazuddin of Reaz Garments, Md. Humayun of Paris Garments, Engineer Mohammad Fazlul Azim of Azim Group, Major (Retd) Abdul Mannan of Sunman Group, M Shamsur Rahman of Style craft Limited, the first President of BGMEA, AM Subid Ali of Aristocrat Limited also came forward and established some of the first garment factories in Bangladesh.

Despite the epic growth of our RMG industry, and its bright prospects, challenges are still there. One of the biggest challenges currently faced by our RMG industry is to ensure workplace safety and better working conditions for the millions of garment workers.

Two major accidents, the Tazreen fire and the Rana Plaza collapse, have brought the issue of workplace safety to the fore and led all stakeholders to act accordingly. Following the unfortunate incidents, various platforms such as the Bangladesh Accord on Fire and Building Safety, the Alliance for Bangladesh Worker Safety and National Plan of Action have been formed to improve building and fire safety of Bangladesh's garment industry.

Natural and man-made hazards may affect industrial production sites by both direct losses (due to physical damage to assets and buildings) and indirect losses (production losses). Indirect losses, e.g. from production downtimes, can exceed direct losses multiple times. Thus, the vulnerability and risks of industrial sectors and to determination of its losses is an important component for analyzing damage and loss assessment. In this paper a theoretical conceptual indicator framework are presented which allow assessing the direct and indirect damage and loss of industrial sectors to fire disasters in a quantitative manner. The results are useful for information sharing and decision making in crisis management and emergency planning (mitigation measures, business continuity planning), since the developed indicator system helps to take the complex phenomenon of industrial vulnerability and the underlying interdependencies into account. Besides the identification and conceptual motivation of the indicators, methodical aspects such as standardization, weighting and aggregation are addressed.

Every year small and large scale of fire in garments factory resulting huge economic damage and loss is a common phenomenon in our country. Damage and Loss depends on different indicators (e.g. magnitude of the fire, flame ability, degree of destroyed materials, loss of life, injury, ecological impact etc.). According to information of Bangladesh Fire Service and Civil Defence 2427 small and large scale of fire occurrences have been occurred in RMG sector in Bangladesh from the year of 2000-2014 in which loss has determined BDT 8997426164, death 368 and injured 680. To prepare this thesis six remarkable fire incidents and their impacts have been observed. The observing factories are Tazreen Fashion, Smart Fashion Export Factory, Tung Hai Sweaters Ltd, Aswad Composite Mills Limited, Standard Group and Mega Yarn Dyeing Mills Limited. From the visited factories loss for the causing fire BDT 31110710177, death 140, injured 392 and jobless 23100 have been estimated. From the secondary data source 72 fire incidents of garments and textile industries have been observed which occurred within the year of 1990-2015. In this case 70% of accidents occurred by electric short circuit. If we estimate the total losses suffered by selected observed factories and loss of fire incidents from 2000 – 2014 amounted that approximately BDT 40108136341, which would be approximately 0.50 per cent of GDP for FY2015.

2. Literature Review

Within this paper I would like to present the estimation of economic loss due to fire in the garments industries of Bangladesh. In this regards different works of the following have been read to understand on it which could be helpful for me. On the basis of their works I have tried to enhance my ideas. Andersson (1997) tried to concentrate on the hazard evaluation in industry and why industrial fire safety has become of increasing importance and also how industrial fire risk analysis should be conducted, in order to meet the demands of both society and industry. Jonkman, Gelder and Vrijling (2002) carried out risk literature aimed at giving an overview of quantitative risk measures in The Netherlands for flooding. In this article he focused mainly on risk measures that consider loss of life and economic damage as a consequence. Hiete and Merz (2009) tried to develop a conceptual framework for the determination of indirect vulnerability of industrial sectors. This framework aims at assessing the overall disaster vulnerability (social, industrial, environmental) of different regions in Germany. The volume - 2 of World Bank Journal (2010) identified damage, loss and need assessment process how to reduce the social, economic and financial implications of disasters and using this methodology to reinforce resilience by promoting the "Build Back Better" principles. Stokes, Dixon, Molano & Nana (2012) reported fire damage in non-residential buildings, cost of replacing and repairing buildings, the loss of building contents in New Zealand. They also include estimates of damage from unreported fires, and indirect damage caused by fires in non-residential buildings and human factors loss of life and injury. ABIR (2014) tried to explore the fire hazard vulnerability hazard management scenario of garments industries in Dhaka from the point of institutional

capacity of Bangladesh Fire Service and Civil Defense (BFSCD). Wadud, Huda and Ahmed in their work (Assessment of Fire Risk in the Readymade Garment Industry in Dhaka, Bangladesh) tried to explore on understanding the status of the 'soft' parameters in fire safety management rather than on the 'hard' parameters which is often the focus of the fire safety certification process. National Human Rights Commission, Bangladesh (2014) urged to justify and investigate the main loopholes of the present labour law of Bangladesh with the support of national and international legal framework for the security and safety of the garments workers in Bangladesh.. Hall (2014) tried to identify the total cost of fire in USA as an economic value with the donated time of volunteer firefighters and cost of deaths and injuries. Biswas (2000), express in his book (Insurance and Risk Management) how to calculate loss for fire insurance. Faruqe (2015), explains in his book (Compliance & Audit) about the development of compliance sector duties and responsibilities of the garments sector which helps the study better. CPD's Rapid Assessment of Flood 2004, (2005), Options for Self-reliant Resurgence helps to use numerical formula to calculate loss for this study.

3. Background of the Research

Bangladesh is a financially grown up country. In this context RMG sector keeps a vital role to improve our economy. But sometimes some unavoidable incidents like fire, building collapse, political unrest, sabotage etc. are greatly influencing the RMG sector in our country. Every year several incidents of fire are creating huge loss and damage in several garments factories and Bangladesh losses millions of foreign currency. Considering this factor, this study has tried to show and analyze the damage and loss due to fire in six selected garments factory named Tazreen Fashion, Smart Fashion, Tung Hai Sweater Limited, Aswad Composite Mills Limited, Standard Garments and Mega Yarn Dyeing Mills Limited and 72 fire occurrence since 1990–2015 by analyzing primary and secondary data. For this reason a questionnaire is prepared, 30 interviews with the questionnaire besides this KII for 25 persons and secondary data analysis on it have been conducted. By these deeds I have tried to analyze data due to fire in the garments sector and their loss in our country.

4. Objectives of the Research

- To estimate economic loss due to fire occurrences in the selected garment factories in Bangladesh.
- To know the facilities available for the prevention of fire accidents in the factories.
- To find out the causes of the accident.
- To suggest for better management of the fire accidents.

5. Research Methodology

Following two types of methods have been followed for acquiring and analyzing data.

Process of Data Acquisition: This study has employed both qualitative and empirical approach because of mixed nature of the problem with a view to achieving the best outcome of the research. The qualitative methodology of research has been applied for subjective assessment based on secondary sources to investigate the loopholes in the fire accidents of RMG sector and the safety and security net of the garments workers in Bangladesh. While doing this part of the research, the existing literatures on the fire of garments industries, insurance for fire, estimation of fire risk, estimation of fire loss and labor laws have been explored and examined thoroughly. Some questionnaires are designed in such manner so that the executive body of the RMG sector and garments workers can express their opinions without any prejudice and bias finding the obstacles as to safety net in consonance with ILO Conventions and standards. The findings of the mixed approach will be categorized systematically and the common findings will be offered as recommendation to amend the current labor and industrial law in the country: Secondary, Data source,KII

Process of Data Analysis: Collecting data has been analyzed by applying following methods to achieve results.

Concept of Economic Losses in Industrial Fire: Economic losses of industrial fire refer to the economic losses which reach certain amounts caused by fire. Typical losses include the decline in output in productive sectors (agriculture, livestock, fisheries, industry and commerce) and the lower revenues and higher operational costs in the provision of basic services (water and sanitation, electricity, transport), as well as the unexpected expenditures to meet humanitarian needs during the post-disaster emergency phase.

Methods of the Economic Loss Estimation of Industrial Fire

The estimation of economic loss of industrial fire has adopted a method of estimating by classes. That is, based on the estimation of economic loss of each class, get the total amount of loss caused by each industrial fire.

Loss of standing resources: refers to the value of real burnt stock volume within the industrial land area caused by each industrial fire, estimated by different things.

The estimating formula is

$$L = \sum_{i=1}^{n} V_i R_i$$

Where,

L= the amount of economic loss of standing resources;
V = the loss of stock volume;
R= price of standing resources;
i= different things, i=I,2, 3...n.

The formula for estimating the loss of stock volume (V) is, loss of stock volume (V) = average stock volume per unit area (V') X fully destroyed rate (P) X burnt area (S)

Every single thing is investigated, classified as burnt thing, damaged thing or non burnt thing, and the losses are defined accordingly.

The determination ' of the price of standing resources (R)

Due to the current price policy of Bangladesh and the different ' situation in the factory area, there are market price inverse estimating method, theoretical cost price estimating method and current planning' price estimating method to determine the price of standing resources (R).

Market price inverse estimating method:

The formula for the price of standing resources (R) is

R = market price of finished goods - logging expenses - circulation costs among which, logging expenses: (I) logging expenses; (II) management expenses;

(III) others circulation costs: (I) transport costs; (II) loading and unloading expenses;(III) management expenses; (IV) others

Theoretical cost price estimating method

According to the basic theory or" factory resources reproduction and in order to ensure the reasonable profit of the resource producers, based on the real expenses and costs, we formulated the list of theoretical cost price of resources in a factory, in which the price level of standing resources of everything at different goods scan be directly found. Investigation can also be carried out in combination with the actual local situations.

Direct Economic Loss

Finished goods, processing goods and Raw materials by-products: All the finished goods, processing goods such as: process flow chart (issue to floor → goods in cutting section → goods in sewing section → goods in washing section → goods in ironing section → goods in packaging section) and raw materials by-products, etc. that are burnt or affected by the reaching of industrial fire at the places including logging site, raw materials storage, finished goods storage and stocking yard.

- The formula for the estimation of the finished things loss in the logging site is: loss (Tk.) = quantity of lost things X production cost price of that things (category wise) (Tk.) - left value of things (Tk.)
- The formula for the estimation of the processing goods loss on stocking yards is: loss (Tk.) = quantity of lost things (sector wise) X producer price (Tk.) - left materials value (Tk.)
- The formula for the estimation of the loss of raw materials is: loss (Tk.) = quantity of lost raw materials (pcs./others) X price of the thing (as per unit Tk.) - value of left things (Tk.)

The formula for the estimation of the loss of things by-products is: loss (Tk.) = quantity of things by-products (per pcs/unit) X market price of the product (per pcs/unit)

Fixed assets: The loss of fixed assets (including industrial or civil buildings, machines and equipments, instruments and meters, vehicles, boats and ships, etc.) burnt by industrial fire is estimated by re-purchase complete value depreciation method.

The formula is: loss (Tk.) = re-purchase complete value (Tk.) X (1 - average rate 'of depreciation per year/month % X number of years/month of service) X burn rate (%)

Repurchase complete value refers to the money needed to rebuild or repurchase the fixed assets. The figures can be found. from the local regulations of the house property - administrative department and relative departments. If it cannot be determined under special circumstances, the original value can be used for estimation instead of repurchase complete value. Among the. formula, burn rate refers to the real degree of burnt in terms of percentage.

Mobile Assets: It refers to the property that takes part in the circulation during the production and management process and changes its forms, such 'a s raw material, materials, ' fuel, being manufactured articles, semi-finished products, and products, etc.

The formula is :loss (Tk.) = quantity of mobile assets X buying -price -left value It is estimated separately according to different kinds of mobile assets, and added up together.

Loss of products of agriculture and animal husbandry in factory areas:

The loss of products of agriculture (such as grains, cotton and oil, etc.) and animal husbandry (such as animal and domestic fowl, etc.) in factory areas is estimated separately by each kind.

Economic loss on agricultural production refers to the damage of different crops surrounded by that industry which is affected by the fire and it is estimated by the following formula:

$$TD_c = \sum_j (Qi * Pi) + \sum Di$$

Where,

Q_i Quantity of crop damage for i-th crop in metric ton

P_i Wholesale price of the i-th damaged crop per metric ton in TK.

Di Lump sum damage estimate for i-th crop in Tk.

Cost of fire protection: This item is the annual average cost of purchasing various fire protection facilities and building fire roads and all the expenses of fire protection team, in order to prevent industrial fire, within a certain period from which the cost of per unit area can be estimated according to destroyed or damaged area. The cost of per unit area multiplied by burnt area is the loss of fire protection expenses.

The formula is: fire protection cost (Tk.) = fire protection cost. per unit industrial (sq feet/sq. meter) X burnt area

Indirect Economic Loss

Stop production, drop in production and close down of business refer to stop production, drop in production because of reducing. managing activities and loss. in the volume of business influenced by industrial fire of the factories of raw materials production, raw materials processing, machinery and other industrial sectors and of the sale and commercial units of industrial products. The estimation method is:. loss from stop production (Tk.) = output of products per unit time X stop production time X ex-factory price per unit product loss from close down of business (Tk.) = turnover per day X number of days of closure

Personnel death and wound: According to the degree of wound it is divided into three classes.

(I) light wound -- the wound that causes loss of ability and the loss is less than 105 working days;

(II) Serious wound -- the wound that causes loss of ability and the loss is 105 or more working days but less than 6,000 days;

(III) Death - - estimated as loss of 6,000 working days loss of personnel death and wound (Tk.) = number of the dead and wounded (person) X number of working days lost ability (day) X salary of different staff (Tk.)

On-the-spot rescue and treatment: includes materials used in fire suppression and the salary of fire fighting personnel.

Expenses of dealing with the aftermath:

- Costs of swamping fire slash and fire site, it is estimated according to the real costs.
- Pension and medical expenses for the dead and wounded people, it is estimated according to the real costs.

Business Interruption Loss:

The term business interruption usually describes the disruption of typical operations as a result of a definable event that is beyond the entity's control. In legal contracts and insurance policies, business interruption means the financial impact of such a disruption over a period of time.

The business interruption formula can be summarized as follows.

$$BI = T * Q * V$$

Where:

BI = business interruption

and:

T = the number of time units (hours, days) operations are shut down

Q = the quantity of goods normally produced, or sold, per unit of time used in T

V = the value of each unit of production, usually expressed in profit

Biological Economic Loss / loss on ecosystem:

Industrial fire has destroyed the biological balance in the forest area, caused deterioration of biological environment and reduced the productivity of forest land. Moreover, the villages and farmlands nearby have lost shelter which endangers the agricultural production and the people's life, and leads, to the deterioration of the production and life environment. Therefore, it is difficult to estimate accurately the loss on the biological environment caused by industrial fire. Considering the current situations and possibilities, estimate only three kinds of loss, i.e. economic loss on agricultural production, economic. loss on ecosystem and loss of wildlife. For the time being, it will be added and perfected by further research and practice.

Loss of wildlife refers to the economic value of lost wildlife in that area after industrial fire. Loss of wildlife (Tk.) = (quantity of wildlife of that area X average current price of wildlife

Grading of Industrial Fire Loss:

On regards to the relevant standards of Bangladesh, fires on RMG sectors are graded into three classes on the basis of the amount lost in resources, property and personnel death and wound caused by one industrial fire:

Class I: Extraordinarily serious industrial fire, the loss of it is more than BDT 100 crore;

Class II: Serious industrial fire, the loss of it is between BDT 50 crore – 100 crore;

Class III: Ordinary industrial fire, the loss of it is less than BDT 50 crore

6. Limitation of the Research

Every research has not beyond of limitation. My research has several limitations. This study is primarily limited by its small sample size. Although the use of expert judgments is a fairly common approach to studying alignment, this study does not provide complete picture assessments. I have not, for example, systematically examined differences in content standards or test specifications, which may account for some of the discrepancies among exams. Furthermore, an analysis of large sample data may have given a good result for this study. On the other hand lack of information and support logistically this paper cannot furnish the result of environmental impacts due to industrial fire especially fire of those factories. Finally, the expenses or losses dealing with aftermath for those incidents (for example: impacts of injured survived workers, disabled personnel and their families and the owners of the factories) did not possible to identify.

7. Analysis of Data: Results and Discussion (Field Survey - 2015)

Fire Occurrence & Impacts Scenario of the Observed Garments at a Glance

Table 1. Fire Occurrence & Impacts Scenario of the Observed Garments at a Glance.

| Name of Company	Date of Occurrence	Time of Occurrence	Causes of Occurrence	Total Workers	Death	Injured	Jobless	Total Loss of the Company (Approximate) BDT
Tazreen Fashion	24-Nov-2012	6: 00pm	The fire, presumably caused by a short circuit	1400	111	300	700	5654166667
Smart Fashion Export Factory	26-Jan-2013	2: 30pm	There was a tire repair and wielding workshop downstairs so officials say that the fire could have started from this point.	450	10	35	400	1295750000
Tung Hai Sweaters Ltd	08-May-2013	11: 00pm	The fire, presumably caused by a short circuit	2700	08	03	0	1999250000
Aswad Composite Mills Limited	08-Oct-2013	5: 45pm	The cause of the blaze was not known	2550	10	50	2000	2251493510
Standard Group	29-Nov-2013	12: 00am	Sabotage	25000	0	0	20000	19278750000
Mega Yarn Dyeing Mills Limited	28-Sep-2014	3: 35am	The fire, presumably caused by a short circuit.	500	01	04	0	631300000
			Total:	32,600	140	392	23,100	31110710177

Source: Field Survey 2015
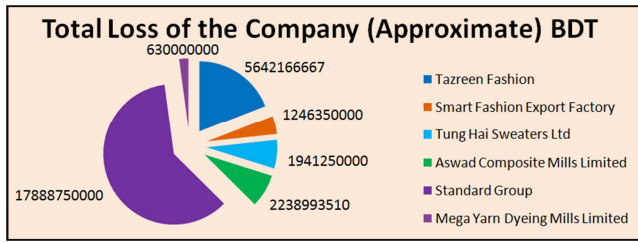
Figure 1. Loss Scenario of those Companies.

Fire Incidents and Losses of the Selected Garments

Total economic loss for the happening of several fire incidents of that industry is estimated BDT 31110710177 within the year of 2012- 2014. This estimation is based on the previously stated methodological definition and formula.

It defines the total losses causing fire occurrence directly or indirectly of that industries. Net losses of those industries have been calculated and try to focus in this table. On the other hand this table shows that total employees are 32600, death 140, injured 392 and jobless 23100 of that six industries. Most of the occurrence has been occurred within evening to night except Smart Fashion. Electric short circuit is the main issue of happening fire. Slandered Group is one of the biggest group of companies in our country but due to political un restless instigated to set fire of the garments by workers of Standard Group along with some non-workers stormed and torched the company. So, the fire of Standard is considered as sabotage.

Table 2. Loss Scenario of Infrastructure.

| Name of Company	Building Structured (Stored)	Total Area (Sq. Ft.)	Affected Area (Sq. Ft.)	Affected/Damaged Area %	Total Damage (BDT)	Total Recovery (BDT)	Recovery (%)	Net Loss (BDT)
Tazreen Fashion	9	51000	49000	96%	500000000	50000000	10%	45,00,00,000
Smart Fashion Export Factory	2	10000	10000	100%	5000000	1000000	2%	40,00,000
Tung Hai Sweaters Ltd	11	125000	35000	28%	100000000	5000000	5%	9,50,00,000
Aswad Composite Mills Limited	10	378800	250000	65%	1000000000	50000000	5%	95,00,00,000
Standard Group	10+10	1680000	1680000	100%	3000000000	750000000	25%	225,00,00,000
Mega Yarn Dyeing Mills Limited	7	153152	21000	14%	10000000	50000000	50%	50,00,000
Total								375,40,00,000

Source: Field Survey 2015
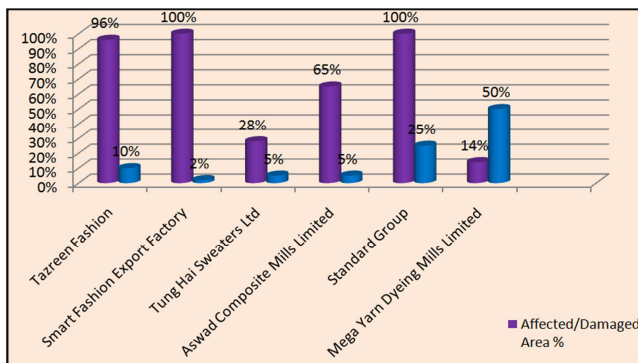
Figure 2. Loss of Affected Infrastructure.

Loss of Affected Infrastructure

Among the loss of different sectors, physical damage of infrastructure and the economic loss of it are very much essential. Table: 2 shows that total economic loss of infrastructure of the six observed factories is BDT 3754000000 (Approx.). Specifically if we try to explain, Tazreen Fashion is a 9 storey building conceives of 51000 sq. ft. About 96% which indicates 49000 sq. ft. was affected during setting fire. Loss of affected area which damaged major parts of the factory and only 10% of the affected was recovered, total damage was considered in amount BDT 500000000 (Approx.). By this table it clearly shows that severely affected factories are Smart Fashion and Standard Group. Both the factories were fully (100%) affected and recoveries were very poor. Amongst them less affected factory is Mega Yarn Dyeing Mills Limited. It was affected only 14% and its recovery was 50%.

Table 3. Loss of Machinery.

Name of Company	Total Machinery	Affected Machinery	Affected Machinery (%)	Total Machinery Damage (BDT)	Total Recovery (BDT)	Recovery (%)	Net Loss (BDT)
Tazreen Fashion	650	650	100%	200,00,00,000	20,00,00,000	10%	180,00,00,000
Smart Fashion Export Factory	250	250	100%	1,00,00,000	5,00,000	5%	95,00,000
Tung Hai Sweaters Ltd	650	110	16%	200,00,00,000	5,00,000	10%	195,00,00,000
Aswad Composite Mills Limited	800	480	60%	100,00,00,000	1,00,000	1%	99,50,00,000
Standard Group	1500	1500	100%	700,00,00,000	70,00,00,000	10%	630,00,00,000

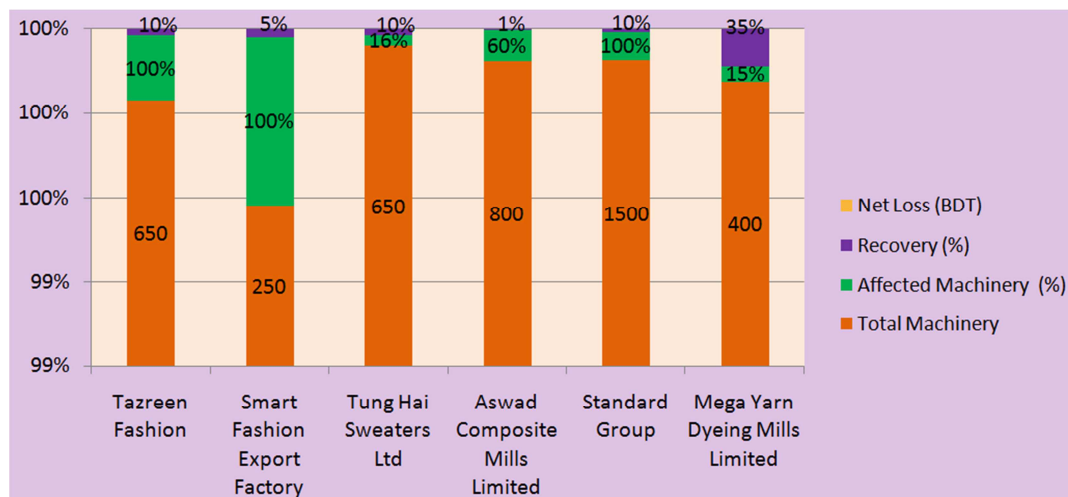| Name of Company	Total Machinery	Affected Machinery	Affected Machinery (%)	Total Machinery Damage (BDT)	Total Recovery (BDT)	Recovery (%)	Net Loss (BDT)
Mega Yarn Dyeing Mills Limited	400	60	15%	25,00,00,000	8,75,00,000	35%	16,25,00,000
Total	4250	3050	65.16% (Avg.)			11.83% (Avg.)	1121,70,00,000

Source: Field Survey 2015

Figure 3. *Loss of Affected Machinery.*

Loss of Machinery

A factory is equipped by different types of machinery or equipments. Here considerate machinery is sewing machine, knitting machine, linking machine and jacquard machine etc. for the calculation of loss of production equipments. The equipments of those factories were fully (100%) affected indicates the table are Tazreen Fashion, Smart Fashion and Standard Group and their rate of recovery respectively 10%, 5% & 10%. The machinery of Tung Hai Sweaters Limited and Mega Yarn Dyeing Mills Limited were affected 16% & 15% respectively and rate of recovery were 10% & 35%. Amongst of the six factories the lowest recovery is seen from the table 1% indicates Aswad Composite Mills Limited. From the table we can understand that among total production equipments of those factories were 4250 and affected 3050 which were 65.16% of total equipments and there rate of recovery 11.83%. Net loss of machinery of the observed factories is BDT 11217000000 (Approx.).

Table 4. *Losses of Materials.*

| Name of Company	Total Damage Raw Materials BDT	Total Raw Materials Recovery BDT	Net Loss of Raw Materials BDT	Total Damage Processing Goods BDT	Total Processing Goods Recovery BDT	Net Loss of Processing Goods BDT	Total Damage Finished Goods BDT	Total Finished Goods Recovery BDT	Net Loss of Finished Goods BDT
Tazreen Fashion	1,00,00,000	20,00,000	80,00,000	50,00,000	10,00,000	40,00,000	5,00,00,000	50,00,000	4,50,00,000
Smart Fashion Export Factory	5,00,00,000	15,00,000	4,85,00,000	10,00,000	1,00,000	9,00,000	1,00,00,000	10,00,000	90,00,000
Tung Hai Sweaters Ltd	1,00,00,000	10,00,000	90,00,000	5,00,00,000	10,00,000	4,90,00,000	5,00,00,000	1,00,00,000	4,00,00,000
Aswad Composite Mills Limited	1,00,00,000	15,00,000	85,00,000	50,00,000	10,00,000	40,00,000	2,50,00,000	15,00,000	2,35,00,000
Standard Group	100,00,00,000	10,00,00,000	90,00,00,000	50,00,00,000	1,00,00,000	49,00,00,000	10,00,00,000	10,00,000	9,90,00,000
Mega Yarn Dyeing Mills Limited	5,00,000	1,00,000	4,00,000	5,00,000	1,00,000	8,00,000	0	0	1,00,000
Total			97,44,00,000			54,87,00,000			21,66,00,000

Source: Field Survey 2015
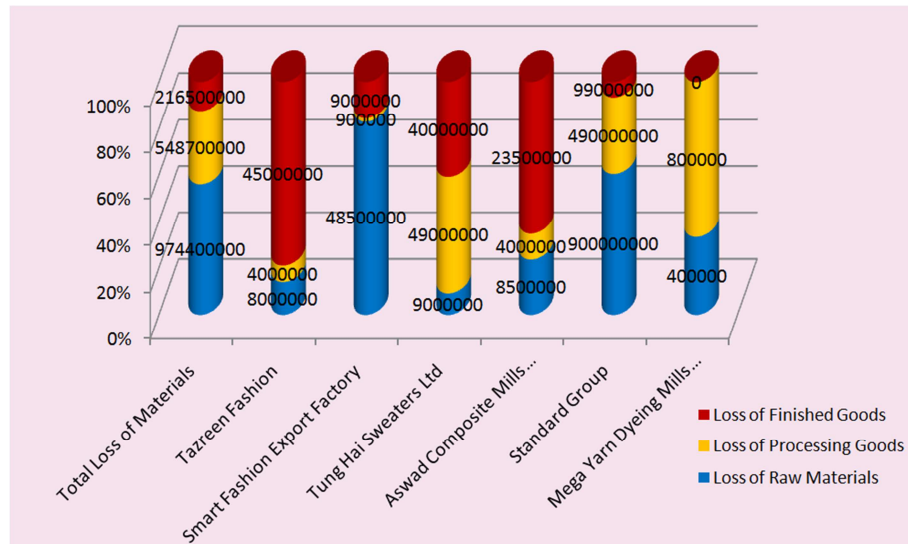
Figure 4. *Loss of Materials.*

Loss of Materials

Physical damage and loss of materials refers to the different types of materials or goods (eg. Physical damage to raw materials, products in stock or finished goods, semi finished products etc.). This table refers to the net loss of raw materials of six factories is BDT 974400000 (Approx.), loss of processing or semi finished goods is BDT 548700000 (Approx.) and loss of finished goods is BDT 216600000 (Approx.). The consolidated losses of materials are BDT 1739700000 (Approx.).

Table 5. *Loss of Production.*

Name of Company	Item of Production	Total Production Capacity (Per Day Pieces)	Total Production Loss (Per Day Pieces)	Total Production Loss Per Day(BDT)	Factory was remain closed till 31 Oct. 2015 (Days)	Total Production Loss (BDT)	Total Production Loss (Average) BDT
Tazreen Fashion	1. Knit Polo Shirt 2. Fleece Jacket(fancy) 3. Basic T Shirt	1. Knit Polo Shirt: 20,000 2. Fleece Jacket(fancy): 10,000 3. Basic T Shirt: 25,000	1. Knit Polo Shirt: 20,000 2. Fleece Jacket(fancy): 10,000 3. Basic Shirt: 25,000	Polo Shirt: 20,000X150 = 30,00,000 Fleece Jacket: 10,000X350 = 35,00,000 Basic T Shirt: 25,000X120 = 30,00,000	1057days	Polo Shirt: 317,10,00,000Fl eeceJacket: 369,95,00,000 Basic Shirt: 317,10,00,000	334,71,66,667
Smart Fashion Export Factory	• Trousers /Pants • Jacket • Basic Shirt	1. Trousers/Pants : 6500 2. Jacket: 3,500 3. Basic Shirt: 7,000	1. Trousers/Pants: 6500 2. Jacket: 3,500 3. Basic Shirt: 7,000	Trousers/Pants: 6500X250=16,25,000 Jacket: 3,500X350=12,25,000 Basic Shirt: 7,000X120=8,40,000	995days	Trousers/Pants: 161,68,75,000 Jacket: 121,88,75,000 Basic T-shirt: 83.58,00,000	122,38,50,000
Tung Hai Sweaters Ltd	Knitted sweaters	Knitted sweaters	Knitted sweaters: 65,000	Knitted sweaters: 65,000X250=1,62,50,000	65days	Knitted sweaters: 105,62,50,000	105,62,50,000
Aswad Composite Mills Limited	Knitted sweaters	Knitted sweaters: 70,000	Knitted sweaters: 70,000	Knitted sweaters: 70,000X250=1,75,00,000	100days	Knitted sweaters: 175,00,00,000	175,00,00,000
Standard Group	1. Knit Polo Shirt 2. Fleece Jacket(fancy) 3. Basic Shirt 4. Knitted sweaters	Knit Polo Shirt: 100000 Fleece Jacket(fancy): 65,000 Basic Shirt: 1,50,000 Knitted sweaters: 60,000	Knit Polo Shirt: 100000 Fleece Jacket(fancy): 65,000 Basic Shirt: 1,50,000 Knitted sweaters: 60,000	Knit Polo Shirt: 100000X150=1,50,00,000 Jacket: 65000X350=2,27,50,000 Basic Shirt:	692days	Knit Polo Shirt: 1038,00,00,000 Jacket: 1574,30,00,000 Basic Shirt: 1245,60,00,000	1223,97,50,000

| Name of Company	Item of Production	Total Production Capacity (Per Day Pieces)	Total Production Loss (Per Day Pieces)	Total Production Loss Per Day(BDT)	Factory was remain closed till 31 Oct. 2015 (Days)	Total Production Loss (BDT)	Total Production Loss (Average) BDT
Mega Yarn Dyeing Mills Limited	Knitted sweaters	Knitted sweaters: 50,000	Knitted sweaters: 50,000	1,50,000X120=1,80,00,000 Knitted sweaters: 60,000X250=1,50,00,000 Knitted sweaters: 50,000X250=1,25,00,000	45days	Knitted sweaters: 1038,00,00,000 Knitted sweaters: 56,25,00,000	56,25,00,000
				Total	2954		20179516667

Source: Field Survey 2015
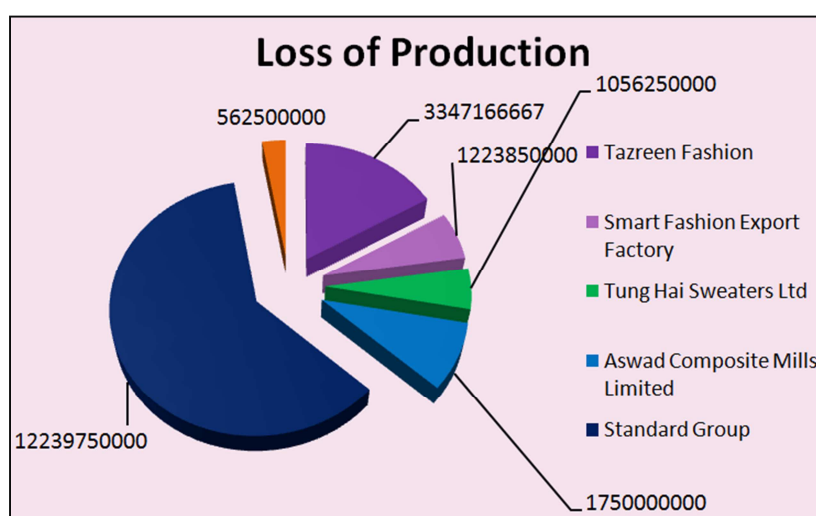
Figure 5. *Loss of Production.*

Loss of Production

Remarkable loss has been observed in production sector. Same goods did not produce of those companies. Different products have different cost and different selling prices. In these calculation average minimum prices of different products has been considered. Tazreen Fashion, Smart Fashion and Standard Group have not been run into production and others were remained close for a certain time due to set fire. So, Production loss has been calculated how many days have been closed from the date of occurrence to 31st of October, 2015. Specifically production loss of different companies has been shown in the table and chart also. And the table shows that total loss of production of the six companies BDT 20179516667 (Approx.) against period of 2954 days.

Table 6. *Loss Scenario.*

| Name of Company	Net Loss of Infrastructure (BDT)	Net Loss of Machinery (BDT)	Net Loss of Raw Materials BDT	Net Loss of Processing Goods BDT	Net Loss of Finished Goods BDT	Total Production Loss (Average)	Getting Insurance Facilities of a Company from Insurance Co.	Total Loss of the Company (Approximate) BDT
Tazreen Fashion	450000000	1800000000	8000000	4000000	45000000	3347166667	0	5654166667
Smart Fashion Export Factory	4000000	9500000	48500000	900000	9000000	1223850000	0	1295750000
Tung Hai Sweaters Ltd	95000000	1950000000	9000000	49000000	40000000	1056250000	1200000000	1999250000
Aswad Composite Mills Limited	950000000	995000000	8500000	4000000	23500000	1750000000	1479506490	2251493510
Standard Group	2250000000	6300000000	900000000	490000000	99000000	12239750000	3000000000	19278750000
Mega Yarn Dyeing Mills Limited	5000000	162500000	400000	800000	100000	562500000	100000000	631300000
Total	3754000000	11217000000	974400000	548700000	216600000	20179516667	5779506490	31110710177

Source: Field Survey 2015
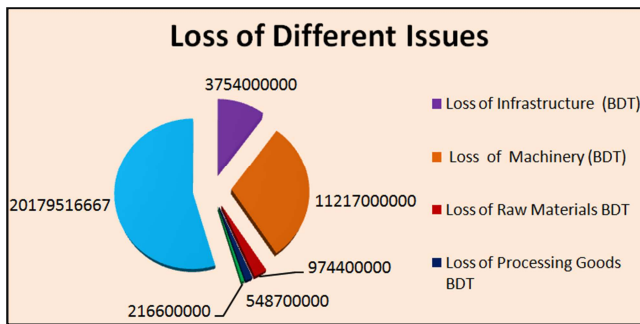
Figure 6. Loss of Different Issues.

Table 7. Scenario of Affected Employee.

Name of Company	Total Workers	Death%	Injured%	Jobless
Tazreen Fashion	1400	7.92%	21.42%	50%
Smart Fashion Export Factory	450	2.22%	7.77%	88.88%
Tung Hai Sweaters Ltd	2700	0.30%	0.11%	0%
Aswad Composite Mills Limited	2550	0%	0%	78.43%
Standard Group	25000	0%	0%	80%
Mega Yarn Dyeing Mills Limited	500	0.20%	0.80%	0%
Total	32600	1.77%(Avg.)	5.02%(Avg.)	49.55%(Avg.)

Source: Field Survey 2015

Loss Scenario

When a factory affects by setting fire, different types of losses are observed. To calculate the overall losses of the factory, loss of different sectors is accumulated. The table shows that loss of six factories consolidated BDT 31110710177 (Approx.) which refers. 45% of our GDP of 2015. In this case to calculate their loss getting insurance coverage from the insurance company has been subtracted here. By comparing with the different losses, loss of production symbolized the highest amount of all losses which is BDT 20179516667.

This below table shows that the highest employee death 7.92% and injury is also recorded 21.42% in Tazreen Fashion. Highest jobless 88.88% in Smart Fashion Export Factory. So far we know after the incident Smart Fashion being remain closed. So, the employee of that garment became jobless. The second highest jobless situation holds Standard Group 80%. Mainly this factory is victimized by the sabotage and the incident occurred at midnight so, most of the sectors of this factory destroyed and it has not run in production yet. From this table we can see that there was no death and injury in Standard Group fire but the amount of jobless is very high. From the six incidents 49.55% employee being jobless among 32600 employees in spite of 0% jobless condition in Tung Hai Sweaters Ltd and Mega Yarn Dyeing Mills Limited.
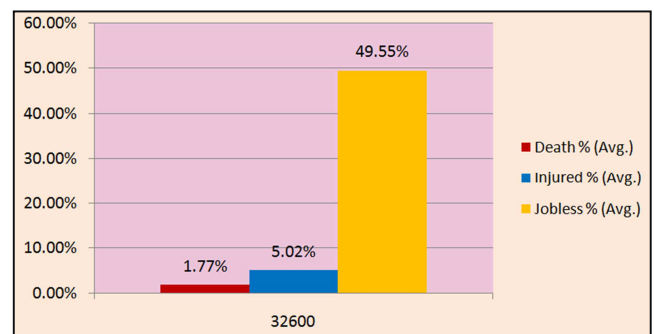

Figure 7. Status of the Employee.

Table 8. Valuation of the Employee.

Name of Company	Death Person	Considering Value of a Death Person (18-60) Years BDT = (6000 WD x 500 SPD)	Total Value Of Death Persons (18-60) Years BDT	Injured Person	Total Cost of Injured Persons for 30 Days. If their treatment cost Considered BDT 5000 per day	Number of Disabled Person	Cost of a Disabled Person (18-60) Years = 6000 WD x (500 SPD+350TC)	Total Value of Disabled Persons (18-60) Years
Tazreen Fashion	111	30,00,000	33,30,00,000	300	45,00,000	10	51,00,000	5,10,00,000
Smart Fashion Export Factory	10	30,00,000	3,00,00,000	35	5,25,000	4	51,00,000	2,04,00,000
Tung Hai Sweaters Ltd	08	30,00,000	2,40,00,000	03	45,000	0	51,00,000	0
Aswad Composite Mills Limited	10	30,00,000	3,00,00,000	50	7,50,000	2	51,00,000	1,02,00,000
Standard Group	0	30,00,000	0	0	0	0	51,00,000	0
Mega Yarn Dyeing Mills Limited	01	30,00,000	30,00,000	04	60,000	0	51,00,000	0
Total	140		42,00,00,000	392	58,80,000	16		8,16,00,000

Source: Field Survey 2015

Valuation of the Employee

In this table indicates the size of death 140, injured 392 and number of disability is 16 among the injured people. In spite of having been the quantity of death and injured person nil in the occurrence of Standard Group the quantity of death and injury are not so little. Valuation of death, injured and disabled person is very difficult and it's never be measured accurately but different methodology have been used here to

calculate the value of loss of life, injury and disability. Generally the value of death person has been considered more than the injured and disable person but here the value of injured and disable person considered higher than that of death because their living cost, treatment cost, family expenditure and inflation should be considered. To calculate the value of a death person 600 working days (WD) multiplied by 500 as per day salary (SPD) has been considered and in context of disable person, the product of 600 working days multiplies by (500 + 350) in which

indicates salary per day plus treatment cost (TC) has been considered for valuation of a person with disability. According to the calculation the value of a death person measured BDT 3000000 and a disabled person BDT 5100000. And the value of injured person is measured in consideration of per day treatment cost BDT 5000 multiplied by 30 days because of their expenditure has been considered for one month. By this calculation total value of mentioned death persons is BDT 420000000 and a disabled person is BDT 81600000.

Table 9. *Providing Insurance Facilities.*

Name of Company	Death Person	Insurance Facilities got per Death Worker	Number of Death Workers got	Total Amount Received by Death Workers	Death Workers got (%)	Injured
Tazreen Fashion	111	1,00,000	20	20,00,000	18.01%	300
Smart Fashion Export Factory	10	0	0	0	0%	35
Tung Hai Sweaters Ltd	08	7,00,000	8	56,00,000	100%	03
Aswad Composite Mills Limited	10	2,00,000	7	14,00,000	70%	50
Standard Group	0	0	0	0	0%	0
Mega Yarn Dyeing Mills Limited	01	3,00,000	1	3,00,000	100%	04
Total	140		46	93,00,000	32.86%	392

Table 9. *Continued.*

Name of Company	Insurance Facilities got per Injured Worker	Number of Injured Workers got	Injured Workers got (%)	Total Amount Received by Injured Workers	Getting Insurance Facilities of a Company from Insurance Co.
Tazreen Fashion	0	0	0%	0	0
Smart Fashion Export Factory	0	0	0%	0	0
Tung Hai Sweaters Ltd	200000	03	100%	600000	120,00,00,000
Aswad Composite Mills Limited	50000	50	100%	2500000	147,95,06,490
Standard Group	0	0	0%	0	300,00,00,000
Mega Yarn Dyeing Mills Limited	50000	04	100%	200000	10,00,00,000
Total		57	14.54%	33,00,000	4699506490

Source: Field Survey 2015

Insurance Facilities

Most of the employees in different sectors are not awarded of their lives and insurance because of their darkness and illiteracy. So, they are being deprived frequently in their life. In this table refers that 46 employees among 140 death

employees which indicates 32.86% and 57 of 392 injured employees refers 14.54% have got providing insurance facility as they are enlisted employee of a fire accidental insurance coverage.

Table 10. *Compensation, Treatment and other Facilities Provided by the Government, Company & BGMEA.*

Name of Company	Death Person	Govt. / BGMEA / Company Subsidy Per Death Person	Number of Death Workers got	Funeral / Other Facility Per Death Person Provided by the Company	Number of Death Persons got	Total Amount Received by Death Workers
Tazreen Fashion	111	6,00,000	43	0	0	2,58,00,000
Smart Fashion Export Factory	10	10,49,000	10	0	0	1,04,90,000
Tung Hai Sweaters Ltd	08	0	0	0	0	0
Aswad Composite Mills Limited	10	5,00,000	10	50000	10	55,00,000
Standard Group	0	0	0	0	0	0
Mega Yarn Dyeing Mills Limited	01	0	0	30000	01	30000
Total	140		63		11	41820000

Table 10. *Continued.*

Name of Company	Injured	Govt./BGMEA/Company Subsidy Per Injured Person	Number of Injured Workers got	Total Amount Received by Injured Workers	Total Amount Received by Death Workers (%)	Total Amount Received by Injured Workers(%)
Tazreen Fashion	300	1,00,000	63	63,00,000	38.74%	21%
Smart Fashion Export Factory	35	10000	35	35,00,000	100%	100%
Tung Hai Sweaters Ltd	03	0	0	0	0%	0%
Aswad Composite Mills Limited	50	0	0	0	100%	0%
Standard Group	0	0	0	0	0%	0%
Mega Yarn Dyeing Mills Limited	04	0	0	0	100%	0%
Total	392		98	9800000	56.45%	20.16%

Source: Field Survey 2015

Compensation for Treatment, Funeral and other Facilities

Different types of compensation and facilities had been provided to the death and injured persons by the government authority, BGMEA, their own company and other organization as far I know 63 death persons got subsidy of Government, BGMEA, their own company or other organizations and 11 death workers got funeral facility among 140s that refers 56.45% of total death and their receiving amount BDT 41820000. On the other hand 20.16% of injured person got treatment facility of government authority and BGMEA. Mainly among six incidents fire on Tazreen Fashion and Smart Fashion Export Factory were very fatal accidents and magnitude of their death and injury were very high. In this context government and BGMEA became very much concern and tried to provide facilities.

Table 11. *Loss of Fire Fighting Units.*

Name of Company	Time of Occurrence	Duration of Control (Hours)	Number of Fire Service Units Works	Cost per Unit per Hour (Approximately) BDT	Total Service Cost of the Fire Service Units BDT
Tazreen Fashion	6: 00pm–6: 00am	11	10	6000	660000
Smart Fashion Export Factory	2: 30pm–3: 15pm	1	9	6000	54000
Tung Hai Sweaters Ltd	11: 00pm–12: 45am	2	13	6000	156000
Aswad Composite Mills Limited	6: 00pm–4: 00am	10	9	6000	540000
Standard Group	12: 00am-3: 00pm	15	22	6000	1980000
Mega Yarn Dyeing Mills Limited	3: 35am–8: 00am	5	11	6000	330000
Total		44	74		37,20,000

Source: Field Survey 2015

Loss of Fire Extinguishers

The expenses of fire protection team, in order to prevent industrial fire, within a certain period from which the cost of per unit area can be estimated according to destroyed or damaged area. The cost of per unit multiplied by cost of per hour is the loss of fire protection expenses. Mostly this loss is generally ignored because it is considered as a duty of government and for this every year an immense loss has to be incurred for this purpose. From the table we can identify that from the six incidents 74 fire extinguisher units takes 44 hours to the control of fire and its approximate cost BDT 3720000. If the cost of every year's fire extinguishing is visualized it will not so little as govt. expenditure.

Biological Economic Loss/loss on ecosystem

It is very difficult to estimate accurately the loss on the biological environment caused by industrial fire. Considering the current situations and possibilities, estimate only three kinds of loss, i.e. economic loss on agricultural production, economic loss on ecosystem and loss of wildlife are not possible. For the time being, it will be added and perfected by further research and practice.
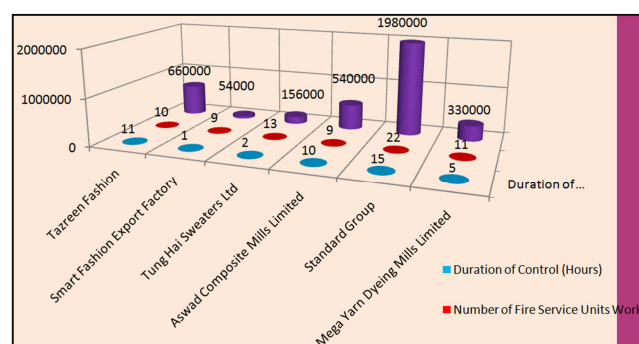

Figure 8. *Loss of Fire Fighting Units.*

Loss of Image

In Bangladesh, fire in garments factory causes huge loss every year. Mainly the damage and loss have been calculated as direct loss like loss of infrastructure, loss of machinery, loss of production, loss of materials etc. But there have several indirect losses which do not be calculated. Loss of image is a kind of indirect loss there has an intrinsic value which is often avoided. In case of fire Bangladesh RMG sector faces different obstacles. Due to lack of work place safety Bangladesh lost GSP facility from the USA. And for the fire incidents many buyers cancel their contract with the affected garments which creates deprivation to earn foreign currency. In this study cannot calculate how much money lost Bangladesh due to loss of image for fire because of limitation of time and opportunity. Furthermore the government of Bangladesh and the owners of the garment factory should take initiatives for this purpose.

Expenses of Dealing with Aftermath:

Different types of secondary losses mainly intangible losses (death, injured, equipment and resources expended to relief, persons with disability, clean up cost, repair cost etc.) which are often avoided and unestimated. Due to limitation of time, lack of logistic and financial support, the mentioned issues could not identify. In this study BDT 3000000 for the death person and BDT 5100000 have been considered for the disabled person as their value of life. Mainly the value of life of a dead person is considered high but I have tried to the value of life of a disabled person is high because he loses his earning capacity and expenditure of medicine is added with this. Besides this social and psychological pain are not measured by money.
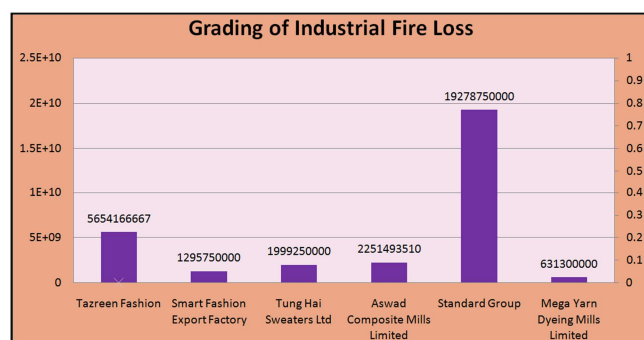
Figure 9. Grading of Industrial Fire Loss.

Grading of Industrial Fire Loss

On regards to the relevant standards of Bangladesh, fires on RMG sectors are graded into three classes on the basis of the amount lost in resources, property and personnel death and wound caused by one industrial fire:

Class I: Extraordinarily serious industrial fire, the loss of it is more than BDT 100 crore;

Class II: Serious industrial fire, the loss of it is between BDT 50 crore – 100 crore;

Class III: Ordinary industrial fire, the loss of it is less than BDT 50 crore.

According to the above mentioned categories, there were no Class III types of losses. The figure shows that only Mega Yarn Dyeing Mills Limited implies Class II category loss because its loss BDT 630000000 and all the losses are Class I category because their loss more than BDT 100 crore.

8. Findings and Recommendation

Key Findings: Findings from different issues are given bellow:

8.1. Causes of Fire

Seventy two fire incidents of garments and textile factory fire have been observed and by those the following causes are identified:
- Electric short circuit
- Mechanical glitch of power generation
- Boiler explosion
- Sparking of fluorescent light
- Iron explosion
- Sparked from machine
- Sparkling from workshop
- Cigarettes or match sticks
- Sabotage
- Unknown

8.2. Causes of Death and Injury

- The emergency exits were locked and the workers could not escape
- Lack of emergency exits
- Size of emergency exits is narrow
- The stairway was dark and full of smoke
- The garment workers were stepping down from the factory following fire panic
- Falling from the staircase
- False fire alarm and creating panic
- During fire broke out the workers were sleeping
- Fire alarm created panic and many workers jumped out of the upper floor
- The stairway was dark and full of smoke and the electricity supply had been shut down and many were death for suffocation.

8.3. Existing Fire Safety Issues

- Most of the factories there were no sufficient water sources inside or outside.
- At present the new generation factories have owned high technology for fire safety.
- There are lack of transport facility mainly the route to enter fire service convoy is very poor in the industrial areas like Gazipur, Savar, Tongi adjacent to the Dhaka city.
- All most all of the factories hang the number of nearby Fire Service and Civil Defence.
- Majority of the factories conduct fire drill.
- There is found fire or emergency exit or stairways in every factory.

8.4. Present Condition of the Newly Established Factories

- The Bangladesh Accord Group created by retailers from the European Union and the Alliance of North American buyers evaluate compliance issues in Bangladesh's readymade garment industry. According to their evaluating report there has a significant change in the RMG sector of Bangladesh.

- Most of the owner of the factories has followed to the building code, fire safety issue, labour law of ILO and Bangladesh etc.
- But a remarkable issue which is a matter of concern for the workers like insurance facility is neglected. And for this most of the fire affected workers are being deprived to get insurance coverage.

8.5. Recommendation

- Owner of the factory should give remarkably importance in electric supply line, wearing cables and electrical equipments.
- Separation of store house from the factory is needed
- All the factories should have wide emergency exits and have an appointed maintenance man who has trained and conscious.
- Awareness building to the employees is very necessary.
- Government should formulate and implement Occupational Safety and Health (OSH) Policy on priority basis
- Properly implement Bangladesh Labour Law and other relevant laws in all factories
- Increase the capacity (manpower & logistic) of Department of Inspection for Factories & establishment and introduce separate inspection system for RMG sector.
- Government should take steps to operate mobile courts in factory level regularly to ensure occupational safety & health.
- Every factory owners should establish building properly following the Bangladesh National Building Code and fire safety guideline.
- Arrange fire safety and OSH training regularly including refreshers training. Also arrange effective fire drill regularly.
- Ensure availability of fire defense materials in each floor of the establishment and use of it when needed.
- Use separate establishment for warehouse & production unit.
- Roof top and all gates of the factory where workers movement exist are remain open during working hour employing adequate number of security guards in each gate.
- Develop a separate RMG Workers Welfare Fund with the contribution of concern employers association, buyers, brands, workers and government to ensure social security of the workers.
- Every factory should have a research wing which will maintain connection with the academic institution because of identifying their problems and the way of solving.

9. Conclusion

Starting from scratch, Bangladesh has come a long way and is now one of 10 new emerging countries in the world. The macroeconomic stability, 6% annual average GDP growth, robust performance of remittance and export, strong foreign currency reserve, and remarkable social and human development over the past decade – all reflect our underlying strengths.

According to the study, the US-based fashion companies are expected to boost their sourcing from Bangladesh in the next two years. McKinsey, a global management consulting firm, described Bangladesh as the next hot spot in apparel sourcing. The renowned firm forecasts export-value growth of 7-9% annually and our apparel export will double by 2015 and nearly triple by 2020 provided that we can successfully overcome a few challenges including developing infrastructure and skill workforce.

Fire occurrences in the garment sectors are very sever. During last 25 years there was heavy lose for fire accidents. So, prepared to control all the activities in the garments sectors are needed. Most of the fire hazards in RMG sector occurs causing electric short circuit in Bangladesh. And this occurrence creates huge economic damage and loss in this sector. In order to attach of the store house or godown with the factory it becomes impossible to out let of the goods from the store house which happens great loss. Distance of fire station is another reason to control of fire. Locked and narrow emergency exits, panic, dark stairway, full of smoke and the electricity supply been shut down and suffocation for the smoke are the main reasons for death and casualty in the garments factories in our country. For this due to lessening the damage and loss in addition with death and injury government and the owner of the factories do follow the additional guidelines of this study would be betterment in our RMG sector.

It is the responsibility of all of us to protect the interest of this industry which has given our economy a strong footing, created jobs for millions of people, especially for women, lifted them from the abyss of chronic poverty and given them a dignified life. Now what we need to do is deal with all the challenges facing our garment industry, paving the way for its further development.

Annexure: 1 (Interview Questionnaire)

Table 12. Information about Responder.

Name of the Responder:
Name of His/her Organization:
Address:
Age:
Sex: a).Male b).Female
Mobile No.

Table 13. Information about industry (Part–I).

Sl.No.	Questionnaire	√Mark	
		Yes	No
01.	Does the factory have any fire protection system?		
02.	Do the employees enjoy any insurance policy provided by the factory?		
03.	Does the factory have any exit stairs during emergency?		
04.	Does the factory have any fire control gas cylinders?		
05.	Is the number of cylinder sufficient?		
06.	Are the employees aware of fire alarm?		
07.	Is the fire drill conducted regularly?		
08.	Are all fire extinguishers and fire fighting equipments in good working condition?		

Sl.No.	Questionnaire	√Mark	
		Yes	No
09.	Are all fire extinguishers visible and within reasonable distance?		
10.	Are all emergency exits unlocked and unobstructed?		
11.	Does the factory have at least 2 (two) emergency exits on and opposite sides?		
12.	Is the plan for evacuation of employees illustrated?		
13.	Are the emergency phone numbers known to all?		
14.	Does the main power supply have visual isolators?		
15.	Is the main power supply clearly identified and easy to access?		

Table 14. Information about industry (Part–II).

Sl No.	Questionnaire	Remarks
01.	What is the type of this factory? a).Knit b).Oven c).Sweater	
02.	Category of the factory	
03.	Man Power: Male Female	
04.	Total Machinery: Sewing Knitting Linking	
05.	Is the factory owned any bank loan?	
06.	If is owned bank loan amount of that.	
07.	Name of Bank with Bank Support: a). Govt. b). Private	
08.	L/C Limit:	
09.	Production Capacity (Per day/ Per hour): Per Hour: Per Day	
10.	Salary Expenditure: Per Hour: Per Day: Per Month:	
11.	Is the factory under the coverage of fire insurance?	
12.	Insurance Coverage: (Who enjoy this facility?) All the employees? No. Second grade officers ?No. First grade officers? No.	
13.	How many losses may happen if it remains close for? An hour (In amount) A day (In amount) A month(In amount)	

Table 15. Information about industry (Part–III).

Sl No.	Questionnaire	Remarks
01.	Is this space rented?	
02.	If it is rented amount of rent (monthly)?	
03.	Factory area ?	
04.	What is the reason of fire?	
05.	What percent of the factory is affected? Nonreparable(Lost) Reparable(Damage)	
06.	How many types of machinery are affected by fire? And approximate price? Sewing	

Sl No.	Questionnaire	Remarks
07.	Knitting Linking Approximate Loss Finished Goods Under processing Raw materials	
08.	Number of casualties: Death Wounded: Curable Incurable	
09.	How many employees lost their job? Male Female	
10.	Total number of purchasing order affected: Placed orders Potential orders Loss of Image	
11.	Amount of present investment(In taka)	
12.	Loss of production Per hour Per day Per month	
13.	Present market value of a product	
14.	What is the type of environmental degradation causing fire?	
15.	Which are the weaknesses of the factory about fire?	
16.	Which are the challenges of the factory on production?	
17.	Recommendations on mitigation of fire	

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