IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Doctrine Of Absolute Liability And Its Impact On Industries: A Critical Study

A DISSERTATION SUBMITTED TO AMITY UNIVERSITY UTTAR PRADESH, LUCKNOW CAMPUS

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF B.A. LL.B. (HONS.)

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A8111120038

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CHAPTER 1

INTRODUCTION

The principle of absolute liability is an established norm in legal frameworks, applicable within both criminal and tort law across various jurisdictions.

There are instances where a person may be held liable for harm, even in the absence of negligence or intent to cause such harm. At times, even proactive efforts to prevent the harm do not exempt one from liability. This principle was notably discussed in the landmark decision of the House of Lords in *Rylands v. Fletcher*, which laid down the foundation for the rule of Strict Liability, also referred to as "No Fault Liability." This principle contrasts with negligence in tort law, where liability arises only when the plaintiff can prove the defendant\u2019s negligence, and the defendant fails to rebut it. Under strict liability, the onus of proving negligence is irrelevant, and liability arises regardless of intent or fault.

In cases where hazardous materials escape from a defendant's property and cause damage to others, the defendant can still be held accountable despite all reasonable care being exercised.

By contrast, absolute liability builds upon strict liability, holding entities engaging in inherently dangerous activities accountable for any harm caused during such activities. The concept evolved notably in India with the *M.C. Mehta v. Union of India*[1] case (popularly known as the Oleum Gas Leak case), where the Supreme Court reinforced the standard of absolute liability by rejecting the exceptions laid out in *Rylands v. Fletcher*[2].

Exceptions not allowed under Absolute Liability:

1. Plaintiff's own mistake
2. Plaintiff's consent
3. Natural disasters
4. Third party's mistake
5. Statutory duty

The principle gained significant legal traction in *Union Carbide Corporation v. Union of India*,[3] further emphasizing the need for strict compliance by corporations to ensure public safety. This doctrine not only seeks justice for victims but also acts as a deterrent for industries to adopt stringent safety measures.

1.1. Statement of Problem

This study examines the consequences and effects of industrial gas leaks in India, emphasizing the principle of absolute liability. It further seeks to explain the broader implications of absolute liability, strict liability, and related case studies.

1.2. Hypothesis

Strict and absolute liability are often seen as exceptions within legal norms, where individuals may be held liable despite a lack of intent or negligence. This dissertation explores how absolute liability functions and its application in landmark cases.

[1] *M.C. Mehta v. Union of India* AIR 1987 1086, SCR (1) 819.
[2] *Rylands v. Fletcher* (1866) LR 1 Exch 265, (1868) LR 3 HL 330.
[3] *Union Carbide Corporation v. Union of India* AIR 1990 273, SCC (2) 540.

1.3. Research Questions

1. What are the definitions and distinctions between strict and absolute liability?
2. Which landmark judgments have shaped the principle of absolute liability?
3. What were the key events and outcomes of the Vishakhapatnam gas leak?
4. What laws govern industrial disasters in India?
5. What insights can be drawn from major gas leak incidents in India?
6. What is the cause behind the surge in industrial accidents in India?
7. Are there any defenses against absolute liability?

1.4. Research Methodology

This study adopts a doctrinal research approach to analyze the doctrine of absolute liability and its applications. Relevant case studies and judicial precedents form the foundation of the research.

1.5. Scope of Study

This dissertation aims to explore the definitions and applications of absolute and strict liability doctrines in the context of gas leak cases in India. It also evaluates the broader impact of these principles on public safety and corporate responsibility.

CHAPTER 2

EXPLAINING STRICT AND ABSOLUTE LIABILITY

2.1. Rule of Strict Liability

To understand the foundation of absolute liability, it is essential to first grasp the rules of strict liability. Absolute liability is often described as strict liability without any exceptions. The roots of strict liability can be traced back to the landmark decision in *Rylands v. Fletcher*[4], where the House of Lords in 1868 laid down its principles. This rule establishes liability even when there is no fault or negligence, provided certain conditions are met.

2.2. Essentials of Strict Liability

For strict liability to apply, the following conditions must be satisfied:

- **Dangerous Thing**: The presence of hazardous materials on a property is the first requirement. Any object or substance that poses a risk to others, such as chemicals, gases, or explosives, qualifies as a dangerous thing. For example, in *Rylands v. Fletcher,* the storage of large volumes of water was deemed hazardous.
- **Escape of the Dangerous Thing**: The hazardous material must escape from the defendant\u2019s premises and cause harm. In *Read v. Lyons and Co.*[5], a hand grenade explosion within the defendant\u2019s premises did not result in liability since the hazardous object did not escape.

[4] *Rylands v. Fletcher* (1866) LR 1 Exch 265, (1868) LR 3 HL 330.
[5] *Read v. Lyons* [1945] KB 216.

- **Non-Natural Use of Land**: The activity must involve an unnatural use of land. Activities such as storing substantial quantities of dangerous chemicals or other hazardous materials would qualify as unnatural. However, ordinary activities, like maintaining chimneys or power lines, are considered natural uses.

2.3. Rule of Absolute Liability

Building on the concept of strict liability, absolute liability eliminates all exceptions. It imposes responsibility on those involved in inherently dangerous activities, regardless of any mitigating circumstances. This principle became prominent in India after the Bhopal Gas Tragedy, where the Supreme Court rejected the defenses available under strict liability.

2.4. Origin of Absolute Liability in India

While the rule of strict liability, as established in *Rylands v. Fletcher*[6], was initially followed in India, its limitations became evident after industrial disasters like the Bhopal Gas Tragedy and the Oleum Gas Leak. The Indian judiciary introduced absolute liability to address these shortcomings and ensure stricter accountability for industrial activities involving hazardous substances.

2.4.1. Essentials of Absolute Liability

The essentials of absolute liability include:

1. **Presence of Hazardous Substances**: The defendant must have inherently dangerous materials in their control.
2. **Escape**: These hazardous substances must escape and cause harm.
3. **No Exception**: Unlike strict liability, no defenses or exceptions are permitted.

2.4.2. Need for Absolute Liability

The dynamic nature of industrialization and technology necessitated a shift from strict to absolute liability[7]. Factors such as rapid industrial growth, widespread use of hazardous substances, and the need for greater social responsibility made absolute liability indispensable in the Indian context.

2.5. Differences Between Strict and Absolute Liability

The doctrines of strict liability and absolute liability, while closely related, differ significantly in their application, scope, and consequences. These differences are pivotal in understanding how the law addresses harm caused by hazardous or dangerous activities. Below are the key distinctions:

Aspect	Strict Liability	Absolute Liability
Scope of Application	Strict liability applies primarily to **unnatural land use** involving dangerous substances.	Absolute liability applies to both **natural and unnatural uses of land**, without exceptions.

[6] *Supra note 1*.
[7] *Union Carbide Corporation v. Union of India* AIR 1990 273, SCC (2) 540.

Exceptions	Strict liability allows several defenses, such as:	Absolute liability allows **no exceptions**, ensuring complete accountability.
	- Acts of God (natural disasters).	For example, in the *Oleum Gas Leak Case*, the defendant was held liable even though external factors were cited.
	- Third-party intervention.	
	- Plaintiff's own fault.	
	- Statutory authority.	
Compensation	Compensation under strict liability is **proportional to the damage caused** and limited in scope.	Compensation under absolute liability is **exemplary**, aiming to deter future negligence and safeguard society.
Origin	The concept was established in *Rylands v. Fletcher (1868)* and has since influenced global legal norms.	Absolute liability was developed by the Indian judiciary post-Bhopal Gas Tragedy and *Oleum Gas Leak Case*.
Relevance	Strict liability rules were effective in addressing limited industrial risks during earlier times.	Absolute liability addresses **modern industrial risks** in developing economies like India.
Accountability	Defendants can avoid liability if they prove their actions fall under an exception.	Defendants are **fully accountable** regardless of the circumstances.

Explanation of Key Differences

1. **Scope of Application**:

   Strict liability is constrained to situations where dangerous substances escape from unnatural uses of land. For instance, maintaining a water reservoir, as in *Rylands v. Fletcher*, qualifies as unnatural use. Conversely, absolute liability disregards this distinction and applies even if the activity is considered natural.

2. **Defenses and Exceptions**:

   Under strict liability, defendants can escape responsibility by invoking exceptions. For example, if a chemical spill occurs due to an unforeseeable earthquake (an act of God), the defendant may not be held liable. However, absolute liability eliminates all such defenses. This shift was critical in cases like the *Bhopal Gas Tragedy* and *Oleum Gas Leak*, where the harm caused was so extensive that accountability was non-negotiable.

3. **Compensation**:

   Strict liability provides compensation based on the extent of actual harm, which may not always reflect the gravity of the incident. Absolute liability, however, mandates exemplary compensation to reflect the magnitude of the offense and act as a deterrent for future negligence. For instance, in the *Oleum Gas Leak Case*, the compensation was designed to address broader societal and

environmental damages.

4. **Relevance and Modern Context**:

   Strict liability originated in England during an era with fewer industrial hazards, focusing primarily on localized risks. India\u2019s adaptation of absolute liability reflects the complexities of modern industrialization, where the potential for widespread harm necessitates stricter accountability measures.

Examples for Comparison:

- In *Rylands v. Fletcher*, the liability was limited due to the application of strict liability, and defenses like non-natural use of land played a role.
- In *M.C. Mehta v. Union of India (Oleum Gas Leak)*, absolute liability ensured that the company was held accountable, and no defense could reduce their responsibility.

CHAPTER 3
LANDMARK JUDGMENTS

3.1. Oleum Gas Leak Case

M.C. Mehta & Anr. v. Union of India & Ors.

The Oleum Gas Leak Case introduced the concept of *absolute liability*, reshaping the principles governing hazardous industries. In this case, M.C. Mehta[8], a noted social activist, filed a writ petition seeking the closure of *Shriram Industries*, a company engaged in manufacturing hazardous chemicals, situated within a densely populated area.

In 1985, while the case was still pending, an unfortunate incident occurred when toxic gas leaked from one of the company's units. The leak caused the death of one individual and left several others injured. In response, a Public Interest Litigation (PIL) was filed under Articles 21 and 32 of the Constitution of India, advocating for the closure of the factory due to the inherent risks posed by the production of hazardous substances such as caustic chlorine and sulfuric acid.

Chief Justice P.N. Bhagwati observed that while the principles of *strict liability* established in *Rylands v. Fletcher*[9] were relevant, the evolving nature of industrial and technological advancements necessitated a broader doctrine. The court emphasized that the rule from the 1866 precedent, which held that anyone who keeps dangerous substances on their land must ensure they do not escape and cause harm, was no longer sufficient in modern times. The judgment highlighted the importance of updating legal doctrines to reflect advancements in science, technology, and societal changes.

3.1.2. Changes in Laws

[8] *M.C. Mehta & Anr. v. Union of India & Ors.*, 1987 AIR 1086, 1987 SCR (1) 819.
[9] *Rylands v. Fletcher* (1866) LR 1 Exch 265, (1868) LR 3 HL 330.

Legal frameworks must evolve to address the complexities of modern industrial activities. The court emphasized that companies operating in hazardous industries bear an **absolute obligation** to ensure the safety of workers and the surrounding community. This obligation mandates that such companies implement safeguards to prevent harm caused by their activities.

The court declared that industries engaging in dangerous or inherently hazardous activities have an unequivocal duty to prevent harm and must take full responsibility for any adverse effects arising from their operations. If harm does occur, it is the company's duty to compensate affected individuals without invoking traditional defenses or exceptions.

3.1.3. Social Responsibility

The principle of absolute liability outlined a heightened standard of social responsibility for industries involved in hazardous activities. The court identified the following key elements:

1. **Necessity of Dangerous Activities**: While hazardous activities may be essential for industrial and economic growth, companies conducting such activities are obligated to compensate individuals harmed by their operations.
2. **Resource and Innovation Responsibility**: Companies have the financial resources and technological expertise to devise and implement adequate safeguards. Thus, they are best positioned to mitigate risks associated with their operations.

The judgment reinforced the idea that industries must prioritize the safety and welfare of the communities they impact over profitability.

3.1.4. Compensation

The court held that when a company is involved in hazardous activities, it cannot rely on the traditional exceptions outlined in *Rylands v. Fletcher*[10]. Compensation must be proportionate to the extent of damage caused by the incident, ensuring adequate redressal for the victims.

The emergence of this principle in India stemmed from the catastrophic events of the *Bhopal Gas Tragedy* and the *Oleum Gas Leak*[11]. These incidents underscored the inadequacy of existing liability doctrines and highlighted the need for an alternative approach that prioritizes accountability and justice for victims.

3.2. The Bhopal Gas Tragedy

3.2.1. Facts

On the night of December 2-3, 1984, the world witnessed one of the most devastating industrial disasters when a lethal gas, methyl isocyanate (MIC), leaked from the Union Carbide pesticide manufacturing plant in Bhopal, Madhya Pradesh. MIC, a highly toxic chemical used in the production of pesticides, was stored in large quantities at the plant. The leak occurred due to a failure in safety systems, which allowed water to enter the MIC storage tank, triggering an exothermic reaction that led to the release of around 40 tons of the

[10] *Rylands v. Fletcher* (1866) LR 1 Exch 265, (1868) LR 3 HL 330.
[11] *Union Carbide Corporation v. Union of India*, AIR 1990 273.

deadly gas into the atmosphere[12].

The gas spread rapidly across densely populated areas near the plant, causing widespread casualties and suffering. Within hours, thousands of people succumbed to the effects of the toxic fumes, while many more suffered severe respiratory problems, eye irritation, blindness, and other long-term health complications. The immediate death toll was estimated at 4,000, but the long-term impact incapacitated over 1.5 million individuals, with generations born afterward suffering from genetic defects and chronic illnesses linked to the disaster.

Legal and Government Action:

In response to this tragedy, the Indian government filed a lawsuit in February 1985 against the parent company, Union Carbide Corporation (UCC), demanding $3.3 billion in compensation for the immense loss of life, long-term health impacts, and environmental damage. However, citing the principle of *forum non-convenience*, which allows cases to be tried in a more appropriate jurisdiction, the case was returned to India.

The Indian courts then facilitated an out-of-court settlement in 1989, where UCC agreed to pay $470 million (approximately $740 million in adjusted terms) as compensation. This amount, though significant at the time, was widely criticized for being insufficient given the scale of the disaster. Many felt it failed to account for the long-term medical needs of victims, environmental rehabilitation, and the generational health issues caused by the tragedy. Critics argued that the settlement was reached under duress, with inadequate negotiation and representation of the victims[13].

Public Outrage and Criticism:

The settlement sparked outrage among activists, legal experts, and the affected communities. The public argued that the amount neither reflected the severity of the incident nor ensured justice for the victims. Furthermore, the agreement included clauses that seemingly shielded UCC from future liabilities, including criminal prosecution. This caused further distrust among the victims, who felt abandoned by the legal system.

Aftermath and Legacy:

The Bhopal Gas Tragedy remains a glaring example of corporate negligence and inadequate regulatory oversight. The lack of proper safety measures, emergency preparedness, and contingency planning were identified as key factors contributing to the disaster. Moreover, the incident highlighted the vulnerabilities of marginalized communities living near hazardous industries, as they bore the brunt of the tragedy.

Over the years, survivors and activists have continued their fight for justice, demanding higher compensation, environmental cleanup of the affected area, and accountability for those responsible. The disaster also spurred significant legal and policy changes in India, leading to stricter industrial safety

[12] *Union Carbide Corporation v. Union of India* AIR 1990 273, SCC (2) 540.

[13] https://www.geeksforgeeks.org/

regulations and the introduction of the *Environment Protection Act, 1986*, which aimed to address the gaps in environmental governance exposed by the tragedy.

The Bhopal Gas Tragedy serves as a grim reminder of the need for rigorous industrial safety standards and corporate accountability. It underscores the importance of prioritizing human lives over profit in hazardous industries and the role of the legal system in safeguarding public welfare.

3.2.2. Issues Raised

The Bhopal Gas Tragedy raised critical legal, ethical, and societal questions, primarily focusing on the accountability of industries operating with hazardous substances and the applicability of legal doctrines to industrial disasters.

Issues Raised:

1. **Extent of Industry Responsibility**:

   The tragedy questioned the extent of liability Union Carbide Corporation (UCC) should bear for the disaster. This involved examining the adequacy of safety measures in the plant, the lack of contingency planning, and the company's role in designing and maintaining the plants infrastructure.
   - Could UCC be held accountable solely for negligence, or did the nature of the disaster necessitate a stricter standard of liability?
   - How should multinational corporations balance profit-making with ensuring the safety of local populations, particularly in developing countries with limited regulatory frameworks?
2. **Applicability of Absolute Liability**:

   The incident raised the question of whether the doctrine of absolute liability should be applied. Under this principle, industries engaged in inherently dangerous activities are fully accountable for any harm caused, regardless of intent, fault, or precautions taken.
   - Should exceptions allowed under strict liability, such as acts of God or third-party intervention, apply in cases involving hazardous industries?
   - Would adopting absolute liability strengthen accountability and provide better redress for victims in such large-scale industrial disasters?

Judgment

In its verdict, the Supreme Court delivered a landmark judgment addressing the issues raised:

1. **Settlement Agreement**:

   The court upheld the out-of-court settlement of $470 million, considering it a practical resolution to ensure timely compensation for the victims. However, the decision drew significant criticism for being inadequate in addressing the scale of harm caused by the disaster.
2. **Striking Down Criminal Immunity**:

   The court invalidated a clause in the settlement that would have exempted UCC from criminal liability. This was a crucial decision, as it underscored that industries cannot escape prosecution for criminal negligence, even if a monetary settlement is reached. It reinforced the principle that

corporate entities must be held accountable for actions that result in harm to human life and the environment.

3. **Principle of Absolute Liability**:

   The court emphasized the importance of applying a stricter standard of liability for industries engaged in hazardous activities. The judgment stated that even if UCC had taken all possible precautions, it would still bear full responsibility for the disaster due to the inherent risks associated with the use and storage of methyl isocyanate. This aligned with the doctrine of absolute liability, which eliminates defenses such as acts of God, third-party intervention, or absence of negligence.

4. **Broader Implications**:

   While the principle of absolute liability was acknowledged in this case, its application was more definitively established in the subsequent *Oleum Gas Leak Case*. The Bhopal judgment highlighted the inadequacy of strict liability in addressing modern industrial risks and set the stage for the development of a no-fault liability regime for hazardous enterprises.

Analysis of the Judgment

The judgment had far-reaching implications for industrial safety, corporate accountability, and environmental law in India:

- **Reinforcing Accountability**: The courts decision to reject criminal immunity for UCC sent a strong message to corporations about the consequences of negligence in hazardous industries.
- **Highlighting Legal Gaps**: The tragedy exposed the inadequacies of existing legal frameworks, particularly the strict liability principle, in dealing with large-scale industrial disasters.
- **Catalyst for Legal Reforms**: The case prompted the Indian government to introduce stricter laws, including the *Environment Protection Act, 1986*, and adopt the principle of absolute liability in subsequent cases.

3.3. The Vishakhapatnam Gas Leak[14]

Facts

On May 7, 2020, a catastrophic gas leak occurred at the polymer manufacturing plant of LG Polymers India Pvt. Ltd., located in Vishakhapatnam, Andhra Pradesh. The leaked substance, styrene, is a hazardous gas used in the production of plastics. This tragic incident resulted in the deaths of 11 individuals and adversely affected thousands of residents living near the plant. Many suffered from symptoms such as respiratory distress, skin irritation, eye injuries, and neurological complications.

The initial investigation revealed that the disaster was caused by the company's failure to adhere to the *Manufacture, Storage, and Import of Hazardous Chemical Rules, 1989*. These regulations mandate industries to establish robust contingency plans, including on-site and off-site emergency measures, to minimize the risks posed by hazardous substances. It was discovered that LG Polymers lacked adequate

[14] 1990 AIR 273, 1989 SCC (2) 540

safety protocols and had not conducted proper risk assessments for the storage and handling of styrene gas. Recognizing the seriousness of the incident, the National Green Tribunal (NGT) took *suo moto* cognizance of the matter and constituted a five-member expert committee to investigate the circumstances leading to the disaster. The committee analyzed the technical, environmental, and legal aspects of the incident and provided its findings to the Tribunal.

3.3.1. Judgment

The NGT, in its judgment, held LG Polymers liable for the disaster and imposed damages of Rs. 50 crore under the "Polluter Pays Principle." This principle mandates that the polluter bear the cost of environmental damage caused by their activities.

Key points from the judgment include:

1. **Environmental Accountability**: The Tribunal emphasized that environmental protection is a foundational principle in Indian jurisprudence and that industries engaging in hazardous activities must operate with utmost responsibility.
2. **Corporate Responsibility**: The judgment highlighted the company\u2019s failure to comply with safety regulations and its negligence in managing hazardous materials.
3. **Compensation**: LG Polymers was directed to pay Rs. 50 crore as interim compensation to the victims and for environmental restoration. This amount was deemed necessary to provide immediate relief, pending further determination of liabilities.

3.3.2. Principles Applied

In its interim order, the court relied on the **Polluter Pays Principle** and the **Strict Liability Principle** to hold the company accountable. However, the application of strict liability over absolute liability sparked widespread debate.

Absolute Liability Justification

Styrene gas, under Rule 2(e) and Entry 583 of Schedule I of the *Manufacture, Storage, and Import of Hazardous Chemical Rules, 1989*, is classified as a hazardous substance. The following factors underscored the case for applying absolute liability:

1. **Dangerous Nature of Styrene**: The hazardous properties of styrene gas and its potential to cause widespread harm made it a clear candidate for the absolute liability[15] doctrine.
2. **Damage Caused**: The gas leak caused significant harm to human life, property, and the environment. The widespread nature of the disaster met all the criteria established for absolute liability.
3. **Corporate Negligence**: The company failed to adhere to safety protocols, further strengthening the argument for absolute liability.

Court's Shortcomings

[15] legalserviceindia.com/legal/article-7666-strict-liability-and-absolute-liability

Despite the precedent set in *M.C. Mehta v. Union of India (Oleum Gas Leak Case)*[16], the court chose to apply the principle of strict liability. This decision was criticized for the following reasons:

1. **Exploitable Exceptions**: Strict liability allows for certain exceptions, such as acts of God or third-party intervention. These exceptions could potentially enable LG Polymers to evade full accountability.
2. **Violation of the NGT Act, 2010**: Section 17 of the *National Green Tribunal Act, 2010*, explicitly mandates the application of absolute liability in cases involving hazardous enterprises. The court\u2019s reliance on strict liability instead of absolute liability contradicted this provision.
3. **Step Backward in Jurisprudence**: The judgment was seen as a regression from the progress made in the *Oleum Gas Leak Case*, where the Supreme Court had clearly established the principle of absolute liability as essential for addressing industrial disasters.

Key Observations

1. **Codification of Absolute Liability in the NGT Act, 2010**:

   The *National Green Tribunal Act, 2010*, incorporates the principle of absolute liability. Under this principle, hazardous enterprises are held fully accountable for any damage caused by their activities, regardless of fault or negligence. The Act explicitly states that this no-fault liability applies even in cases of accidents.

2. **Importance of Absolute Liability**:

   The principle of absolute liability ensures that industries cannot escape their responsibilities by invoking exceptions. It recognizes that industries engaging in hazardous activities bear a social and legal obligation to ensure public safety and environmental protection.

3. **Comparison with Previous Cases**:

   The Vishakhapatnam Gas Leak shared similarities with the *Bhopal Gas Tragedy* and the *Oleum Gas Leak Case*. However, while the principle of absolute liability was applied in the latter cases, the decision to apply strict liability in this instance marked a deviation from established jurisprudence.

The Vishakhapatnam Gas Leak highlighted critical gaps in industrial safety and the enforcement of environmental laws. While the NGTs judgment provided interim relief, its reliance on strict liability instead of absolute liability represented a missed opportunity to reinforce corporate accountability. This incident serves as a reminder of the need for stringent legal standards to prevent industrial disasters and protect the rights of affected communities.

3.4. The 2014 GAIL Pipeline Blast

Facts

On June 27, 2014, in the early hours of the morning, a catastrophic explosion occurred in the GAIL (Gas

[16] 1987 AIR 1086 1987 SCR (1) 819 1987 SCC (1) 395 JT 1987 (1) 1 1986 SCALE (2)1188

Authority of India Limited) pipeline at Nagaram village in the Mamidikuduru Mandal of East Godavari District, Andhra Pradesh[17]. The blast resulted in the deaths of 23 people, including six children, and left 16 others with severe burn injuries. The accident also caused extensive destruction to property, flora, and fauna within a 1-kilometer radius.

The gas pipeline, which carried natural gas to the Lanco power plant, reportedly leaked combustible gases that ignited when a tea vendor lit a stove. The ensuing flames engulfed homes, shops, vehicles, coconut trees, and electrical infrastructure, leaving behind a scene of devastation. The tragedy exposed serious lapses in pipeline maintenance and safety protocols.

Destruction and Impact:

- Human Loss: 23 fatalities, including children who were burned alive in their sleep, and 16 severely injured individuals.
- Environmental Damage: Over 1,145 coconut trees, 13 electrical poles, and large tracts of land were scorched.
- Property Damage: 50 homes and shops were reduced to ashes, along with 16 vehicles.
- Livestock: Numerous animals and birds perished in the fire.

The immediate rescue and relief operations were carried out by local authorities, fire departments, and hospitals. The Prime Minister announced an ex-gratia of ₹2 lakh for the families of the deceased and ₹50,000 for the severely injured. GAIL also declared a compensation of ₹25 lakh for the next of kin of those who lost their lives and ₹5 lakh for those who suffered permanent disabilities.

3.4.1. What Caused the Blast?

The primary cause of the explosion was attributed to **management failure and negligence** on the part of GAIL:

1. **Failure to Install Gas Dehydration Unit (GDU):**
    - GAIL did not meet its commitment to install a Gas Dehydration Unit (GDU) at Tatipaka. This facility was supposed to strip water and hydrocarbons from the “wet” gas to prevent pipeline corrosion and leaks. The absence of the GDU contributed to internal corrosion, leading to the pipeline's failure.
2. **Pipeline Corrosion:**
    - The pipeline, designed to transport dry gas, was used to carry wet gas containing water, carbon dioxide, and sulfur compounds. These substances accelerated corrosion, making the pipeline prone to leaks.
3. **Negligence in Maintenance:**
    - Despite several reported leaks in the pipeline, GAIL resorted to makeshift repairs using clamps and sleeves instead of conducting comprehensive maintenance or replacing the pipeline.

[17] thehindu.com/news/national/live-gail-pipeline-blast-in-ap/article6153701.ece

4. **Inadequate Monitoring:**
    - GAIL failed to implement a proper leak detection system or conduct regular safety audits. Past incidents of leaks in the pipeline were not addressed adequately, despite warnings and complaints from villagers.
5. **Regulatory Oversight Failures:**
    - The absence of proper regulatory enforcement and oversight by agencies like the Petroleum and Explosives Safety Organization (PESO) and the Oil Industry Safety Directorate (OISD) also contributed to the disaster[18].

Key Findings from the Inquiry Report

The inquiry committee, headed by Rajesh Kumar Singh (Joint Secretary, Ministry of Petroleum and Natural Gas), identified the following critical lapses:

1. **Systemic Failures:**
    - GAIL's approach to addressing pipeline leaks through temporary repairs was inadequate and contributed to the disaster.
2. **Violation of Safety Standards:**
    - The pipeline was operated without adhering to the safety standards outlined in the *Manufacture, Storage, and Import of Hazardous Chemical Rules, 1989*.
3. **Corrosion and Wet Gas:**
    - The use of wet gas in a pipeline designed for dry gas led to internal corrosion, increasing the likelihood of leaks.
4. **Ignition Source:**
    - The explosion was triggered when a tea vendor lit a stove near the leak. The accumulated gas formed a vapor cloud that ignited, resulting in the blast.

Ethical and Safety Concerns

The Nagaram disaster raised serious ethical questions regarding the placement of hazardous infrastructure in residential areas:

1. **Negligence by Authorities:**
    - Despite repeated complaints from villagers about the smell of gas and the deteriorating condition of the pipeline, GAIL failed to take preventive measures.
2. **Placement of Pipelines in Villages:**
    - Villagers demanded the relocation of pipelines and gas collection stations away from populated areas to prevent future disasters.
3. **Lack of Proactive Measures:**
    - The absence of proper disaster prevention systems and the delay in responding to warnings

[18] https://www.lawinsider.com/clause/inadequacy-of-damages

highlighted systemic apathy toward public safety.

Lessons Learned and Recommendations

1. **Improved Maintenance and Monitoring:**
   - Regular inspections and maintenance of pipelines, coupled with the installation of leak detection systems, are essential to prevent similar disasters.
2. **Adherence to Safety Commitments:**
   - GAIL and other operators must comply with regulatory requirements, such as installing dehydration units, to ensure pipeline safety.
3. **Accountability:**
   - Stronger enforcement of safety standards by regulatory agencies like PESO and OISD is necessary to hold operators accountable for negligence.
4. **Hazard Management Training:**
   - Operators must provide comprehensive training to personnel on hazard management and emergency response.
5. **Public Awareness and Relocation:**
   - Hazardous infrastructure should be relocated away from residential areas, and communities must be educated about the risks associated with such facilities.

3.5 2014 Bhilai manufacturing plant Gas Leak[19]

On June 12, 2014, a tragic gas leak at the Bhilai Steel Plant (BSP) in Durg district, Chhattisgarh, underscored critical lapses in safety and maintenance protocols at one of Indias most prominent state-owned steel plants, operated by the Steel Authority of India Limited (SAIL).

The incident occurred at Pump House-2, which supplies water to the Gas Cleaning Plant (GCP) of the blast furnaces. The GCP plays a vital role in purifying harmful gases released during steel production before they are either reused or safely released into the environment.

Sequence Leading to the Incident

1. **Pipeline Rupture**:
   - A rupture in the water pipeline disrupted the supply of water to the GCP. This led to a loss of pressure in the system, which created a backflow that allowed hazardous gases from the scrubbers of the blast furnace to infiltrate the water pipeline.
2. **Gas Composition**:
   - The leaking gas contained a mixture of methane and carbon monoxide, both of which are highly toxic. Methane is highly flammable, while carbon monoxide is odorless, colorless, and potentially fatal when inhaled in high concentrations, as it reduces the blood\u2019s

[19] https://www.cpiml.net/liberation/2014/07/gas-leak-bhilai-steel-plant

capacity to carry oxygen.

3. **Exposure and Casualties**:
    - Workers in the vicinity were exposed to the toxic gas as it leaked from the damaged pipeline. The leak proved fatal for six employees, including two deputy general managers who were attending to the breakdown at the site.
    - Over 40 workers suffered severe effects of gas exposure, including respiratory distress, nausea, and unconsciousness. Of these, 26 were hospitalized for further treatment.

Immediate Impact and Damage

1. Fatalities:

- Among the six employees who lost their lives, two were senior officials, highlighting the critical nature of the incident and the dangers even at the managerial level. The deaths occurred due to immediate exposure to the high concentrations of carbon monoxide and methane in the enclosed area near the rupture.

2. Injuries:

- Over 40 workers were affected by the gas exposure. Symptoms ranged from dizziness and nausea to severe respiratory issues. Many workers collapsed on-site, requiring urgent medical attention.
- Of the injured, 26 were hospitalized in serious condition, receiving oxygen support and treatments to counter the effects of carbon monoxide poisoning.

4. **Systemic Failures Highlighted:**

The leak exposed glaring lapses in the plant's operational protocols:

- **Aging Infrastructure**: The pipelines, essential for the plant\u2019s operation, had deteriorated significantly due to corrosion and lack of proper upkeep.
- **Neglected Maintenance**: Maintenance activities were either delayed or conducted inadequately, with temporary fixes replacing long-term solutions.
- **Inadequate Safety Protocols**: The absence of preventive measures, such as gas detection systems, increased the risks for workers operating near hazardous areas.

Significance of the Bhilai Steel Plant

The Bhilai Steel Plant, established in 1955, is one of SAIL's flagship units and among India\u2019s largest integrated steel plants. Known for its contribution to India\u2019s economic and industrial growth, BSP produces a wide range of steel products, including rails for the Indian Railways.

Despite being a profitable unit, the plant's focus on expanding production capacity and boosting profits appeared to have overshadowed the need for worker safety and infrastructure maintenance. The tragedy revealed a troubling prioritization of growth over safety, putting workers lives at risk.

Maintenance and Management Failures

The tragedy exposed a series of management and maintenance issues that contributed to the disaster:

1. **Neglect of Maintenance Work:**
    - In earlier years, BSP relied on small contractors for routine maintenance. This system, while cost-effective, was replaced with larger contractors whose proposals required higher approval levels. As a result, maintenance work was delayed or neglected altogether.
2. **Aging Infrastructure:**
    - The machines and pipelines in the plant were outdated and in dire need of renovation. Instead of investing in repairing and upgrading infrastructure, the management focused on increasing production capacity.
3. **Failure to Address Known Issues:**
    - Pump House-2 had been in poor condition for some time. Despite warnings and past issues with the water pipelines, no substantial repairs or replacements were made.
4. **Lack of Safety Measures:**
    - Before the accident, there were no adequate gas detection systems or alarms to alert workers of leaks. Following the disaster, a gas monitor with a hooter was installed, but this was a reactive measure rather than a proactive safety protocol.

Sequence of Events on June 12, 2014

- **5:30 PM:** Deputy General Manager (DGM) B.K. Singh rushed to Pump House-2 after receiving reports of a pipeline rupture affecting the water supply to the Gas Cleaning Plant (GCP). DGM N.K. Katariya and other staff accompanied him to assess the situation.
- **5:45 PM:** Gas from the scrubbers of the blast furnace began leaking into the water pipeline and escaping into the atmosphere. The gas mixture, consisting of methane and carbon monoxide, began to affect workers at the site.
- **6:00 PM:** CISF jawans nearby observed workers collapsing from the toxic exposure. Some jawans also began to experience the effects of the gas.
- **6:15 PM:** Rescue operations commenced, with fire tenders and CISF personnel evacuating unconscious workers from the site.
- **6:30 PM:** A total of 32 employees were rushed to nearby hospitals. Doctors declared six dead on arrival, while 26 others were treated for injuries.[20]

Key Findings from the Incident

The investigation into the Bhilai disaster identified several critical shortcomings:

1. **Systemic Management Issues:**
    - The report pointed to a lack of proactive maintenance policies and delays in addressing known infrastructure problems.
2. **Aging Infrastructure and Lack of Investment:**

[20] https://indianexpress.com/article/india/india-others/five-killed-in-gas-leakage-at-bhilai-steel-plant/

- The pipeline infrastructure was old and corroded. The absence of necessary upgrades or replacements was a direct cause of the leak.

3. **Safety Protocol Violations:**
   - There were no gas dehydration units or effective monitoring systems in place to detect and prevent leaks.
4. **Reactive Measures:**
   - Following the incident, the damaged section of the pipeline was replaced, and a gas detection system was installed. However, these measures were deemed insufficient, as they failed to address the root causes of the disaster.

Lessons Learned

The 2014 Bhilai Gas Leak underscored the importance of prioritizing maintenance, safety, and worker welfare in industrial operations. Key lessons from the incident include:

1. **Proactive Maintenance:**
   - Regular inspection and timely repair or replacement of aging infrastructure are essential to prevent such tragedies.
2. **Robust Safety Systems:**
   - The installation of gas detection systems and alarms is crucial for early warning and mitigation of risks.
3. **Focus on Worker Safety:**
   - Companies must balance production targets with investments in safety measures to protect workers and prevent accidents.
4. **Accountability:**
   - The management and regulatory authorities must be held accountable for lapses in safety protocols and infrastructure maintenance.

3.7. The 2018 Bhilai Manufacturing Plant Blast[21]

Facts

On October 9, 2018, a catastrophic explosion occurred in the gas pipeline of Coke Oven Battery Complex No. 11 at the Bhilai Steel Plant (BSP) in Chhattisgarh, operated by the state-owned Steel Authority of India Limited (SAIL). The blast happened during maintenance work on the pipeline, resulting in nine fatalities on the spot and leaving 14 others severely injured. The victims included highly skilled employees and members of the fire brigade unit.

The incident revealed lapses in safety protocols and the overall neglect of maintenance, which had become a recurring issue at the plant. The victims' bodies were so badly burned that DNA tests were required for identification.

[21] https://www.industriall-union.org/death-toll-rises-to-12-in-indian-steel-plant-blast

Key Details:

1. **Fatalities and Injuries**:
    - Nine workers, including members of the fire brigade, were killed immediately.
    - Fourteen others sustained severe burns, with some suffering from 80% burn injuries.
2. **Recurring Accidents**:
    - This was the fourth accident at the plant in 2018, with three previous incidents reported in May of the same year.
    - Between 2015 and 2017, SAIL plants, including Bhilai, reported a concerning number of fatalities and injuries[22], highlighting persistent safety issues:
        - **2015**: 20 deaths, 53 injuries.
        - **2016**: 11 deaths, 31 injuries.
        - **2017**: 16 deaths, 35 injuries.
3. **Systemic Neglect**:
    - The explosion was attributed to inadequate maintenance procedures.
    - The Chhattisgarh government's Industrial Health and Safety Department concluded that proper safety protocols were not followed during the maintenance work.

Technical Cause of the Accident

Coke oven gas, a byproduct of the steel production process, is used in the plant for energy and other operational purposes. Handling this gas requires stringent safety protocols, as it is highly flammable and toxic.

1. **Maintenance Work**:
    - The explosion occurred while workers were performing maintenance on the main pipeline, which had been blocked for repairs.
    - Typically, before maintenance, the gas pipeline should be depressurized and checked for any residual gas. A dummy plate is then inserted to isolate the section being repaired.
2. **Possible Failures**:
    - Residual gas was likely present in the pipeline due to incomplete depressurization.
    - A spark—possibly generated by static electricity or equipment—ignited the gas, causing the explosion.
3. **Fire and Blast**:
    - The intense blast and subsequent fire left no time for workers in the vicinity to escape. Even members of the fire brigade, present on-site, were killed in the explosion.

Management and Safety Failures

The Bhilai blast exposed glaring shortcomings in safety practices, infrastructure, and management:

[22] https://www.newsclick.in/nine-killed-bhilai-steel-plant-blast#:~:text=BSP%2C%20located%2040%20km%20west,been%20negligent%20on%20this%20matter.

1. **Absence of a Statutory Safety Committee**:
    - A statutory safety committee, mandated to oversee the implementation of workplace safety norms, had not been constituted for two years prior to the accident.
2. **Aging Infrastructure**:
    - The Bhilai plant, established 68 years ago, had outdated facilities that required urgent upgrades to meet modern safety standards.
    - Repeated maintenance issues were linked to the plant's aging machinery and pipelines.
3. **Negligence in Protocols**:
    - Safety protocols, such as proper depressurization and isolation of the pipeline before maintenance, were not strictly followed.
4. **Recurring Safety Violations**:
    - Despite previous incidents, no significant improvements were made to enhance safety measures.
5. **Lack of Accountability**:
    - Public sector entities like SAIL report their accident figures, but the private sector does not. This lack of transparency hinders comprehensive safety reforms across the industry.

Broader Implications

The 2018 blast is part of a pattern of neglect and systemic failures in the steel manufacturing sector:

1. **High Mortality Rate in Steel Plants**:
    - According to the Centre for Science and Environment, India’s annual mortality rate in steel plants is among the highest globally, with an estimated 50 deaths per year.
2. **Comparison to Other Disasters**:
    - The Bhilai plant’s safety record mirrored other tragic incidents in Chhattisgarh, such as the 2009 BALCO chimney collapse, which killed 45 workers due to non-compliance with basic safety norms.
3. **Impact on Workers’ Morale**:
    - The repeated accidents and lack of visible improvements have left workers demoralized and anxious about their safety.

Economic and Operational Context

The Bhilai Steel Plant, located 40 kilometers west of Raipur, is a critical component of SAIL’s operations and India’s steel industry. The plant was projected to produce 14.1 million tonnes of saleable steel in the 2018-19 fiscal year, with a net worth of ₹35,714 crore and revenue of ₹15,743 crore[23].

Despite its economic significance, the plant’s safety lapses highlight the tension between maximizing production and ensuring worker safety. Without substantial investment in infrastructure upgrades and

[23] https://www.newsclick.in/nine-killed-bhilai-steel-plant-blast

rigorous enforcement of safety protocols, the plant's operations remain a high-risk endeavor.

Lessons from the Blast

1. **Modernizing Infrastructure**:
    - Upgrading the aging machinery and pipelines is critical to preventing similar disasters in the future.
2. **Strengthening Safety Protocols**:
    - Comprehensive and enforced safety protocols must be in place, particularly for high-risk maintenance tasks.
3. **Accountability and Transparency**:
    - Establishing independent monitoring mechanisms and making safety audits publicly available can enhance accountability.
4. **Proactive Worker Safety Measures**:
    - Regular training, proper equipment, and well-defined protocols are essential to safeguard workers in hazardous environments.

CHAPTER 4

DETAILED CASE STUDY

4.1. Vishakhapatnam Gas Leak Case[24]: A Critical Study

The Vishakhapatnam Gas Leak Case of May 7, 2020, is a tragic example of industrial negligence with far-reaching consequences. The incident occurred at the LG Polymers India Pvt. Ltd. plant, situated in the Gopalapatnam area on the outskirts of Vishakhapatnam, Andhra Pradesh. This disaster highlighted critical lapses in safety protocols, maintenance, and regulatory compliance.

The Leak and Its Immediate Impact

The leaked substance, styrene, is a volatile organic compound used in the production of plastics, resins, and rubber. Typically stored as a liquid under controlled temperatures below 20 degrees Celsius, styrene vaporizes quickly when exposed to higher temperatures. On the day of the incident, a malfunction in the plants cooling system caused the temperature of a styrene storage tank to rise uncontrollably, leading to the release of large quantities of styrene vapor.

1. **Spread of the Gas**:
    - The vaporized styrene formed a toxic cloud that spread over a 3-kilometer radius, impacting five nearby villages:
        - Venkatapuram
        - Padmapuram
        - BC Colony
        - Gopalapatnam
        - Kamparapalem
    - The dense population of these areas compounded the severity of the disaster.

2. **Symptoms Experienced by Victims**:
    - Many residents reported difficulty breathing, irritation in the eyes, and nausea shortly after exposure to the gas.
    - Prolonged exposure left several victims unconscious, with some collapsing in the streets.
    - The symptoms were consistent with acute exposure to styrene vapor, which affects the respiratory and central nervous systems.
3. **Casualties and Injuries**:
    - **Fatalities**: The gas leak claimed 11 lives, including children and the elderly, who were more vulnerable to the toxic effects of styrene.
    - **Injuries**: Over 1,000 individuals reported symptoms ranging from mild irritation to severe respiratory distress. Many were rushed to nearby hospitals for emergency treatment.
4. **Environmental and Property Impact**:

[24] 1990 AIR 273, 1989 SCC (2) 540

- Apart from affecting human health, the gas cloud caused damage to vegetation and livestock in the affected areas.
- The rapid spread of the toxic vapor disrupted daily life in the region, forcing many residents to evacuate temporarily.

Root Causes of the Leak

The disaster was primarily attributed to the **failure of LG Polymers to maintain its chemical storage units properly**.

1. **Malfunctioning Cooling System**:
   - The cooling system of the storage tanks, which was responsible for maintaining safe temperatures for the styrene, failed due to poor maintenance.
   - The temperature inside the tanks rose beyond safe levels, triggering the rapid vaporization of styrene.
2. **Neglect of Safety Protocols**:
   - The storage tanks were not equipped with advanced monitoring systems to detect temperature fluctuations or vapor formation.
   - The lack of an alarm system meant that the leak went unnoticed until the gas had already spread to nearby areas.
3. **Regulatory Violations**:
   - The plant had been operating without valid environmental clearances for over two decades.
   - Expansion projects between 2006 and 2018 had been undertaken without adhering to the requirements of the *Environment Impact Assessment Notification, 2006*.

Severity of the Incident

The proximity of the plant to densely populated areas significantly increased the magnitude of the disaster. Residential areas like Venkatapuram and Padmapuram, located within 1 to 2 kilometers of the plant, bore the brunt of the gas leak.

- The incident occurred in the early hours of the morning when most residents were asleep, leaving them unprepared to respond quickly.
- The initial confusion and lack of awareness about the nature of the gas further delayed evacuation efforts, exacerbating the effects on the victims.

Significance of the Incident

The Vishakhapatnam Gas Leak Case serves as a grim reminder of the risks associated with industrial operations in close proximity to residential areas. The disaster underscores the urgent need for:

1. **Stringent Safety Standards**: Regular monitoring and maintenance of chemical storage units must be mandatory to prevent similar incidents.
2. **Effective Regulatory Oversight**: Authorities must ensure strict compliance with environmental and

safety regulations, particularly for industries handling hazardous substances.

3. **Proactive Emergency Response Plans**: Industrial units must establish contingency plans to minimize the impact of unforeseen accidents on surrounding communities.

The Vishakhapatnam Gas Leak remains a stark example of how negligence and inadequate safeguards can result in catastrophic consequences for human health and the environment.

4.2. Background

The LG Polymers plant, originally known as Hindustan Polymers, was established in 1961. Its primary focus was on the production of polymer-based materials, which gained significant traction in the chemical and industrial sectors. In 1978, the plant was acquired by McDowell Holdings, a subsidiary of the United Breweries Group, which expanded its operations. Subsequently, in 1987, the South Korean conglomerate LG Chem acquired the facility, renaming it LG Polymers India. The acquisition by LG Chem allowed the plant to transition into a hub for manufacturing advanced chemical products, including **styrene**, co-polymers, and engineering plastics. These products found applications in various industries, such as automotive, construction, and packaging.

Styrene, the plant's primary product, is a volatile organic compound widely used in the production of plastics, rubber, and resins. Its production and storage, however, require strict safety and environmental measures due to its toxic and flammable nature. Despite its vital role in the industrial supply chain, the facility struggled to comply with essential safety protocols and environmental regulations.

Between 2006 and 2018, the plant underwent five significant expansions to increase its production capacity. These expansions were aimed at meeting the growing domestic and international demand for styrene and its derivatives. However, the expansions were carried out without adhering to the legal requirements outlined in the *Environment Impact Assessment Notification, 2006*. This regulation mandates that industrial units conducting activities that impact the environment must obtain valid environmental clearances before establishing or expanding their operations.

The lack of compliance was evident in the plant's operational setup. LG Polymers India only possessed a **Consent for Establishment** and a **Consent for Operation** from the Andhra Pradesh Pollution Control Board (APPCB). These permits, while necessary, did not substitute for the comprehensive environmental clearances required under the law. The Consent for Establishment and Consent for Operation primarily focus on ensuring that a facility adheres to pollution control norms. However, they do not account for the broader environmental impact of the facility's operations, especially for a plant handling hazardous substances like styrene.

The absence of valid environmental clearances not only reflected regulatory oversight but also highlighted the negligence of LG Polymers in prioritizing safety and environmental stewardship. Despite multiple expansions, the facility continued to operate in violation of legal norms for over two decades. This negligence, coupled with inadequate safety measures, eventually culminated in the disastrous gas leak of May 2020, exposing the vulnerabilities of unregulated industrial growth.

The Vishakhapatnam disaster serves as a stark reminder of the need for stringent regulatory enforcement,

proactive compliance, and prioritization of environmental and human safety over industrial ambitions.

4.3. Styrene and Its Hazards

Styrene, a volatile organic compound with the chemical formula **C8H8**, is a derivative of benzene. While used in the production of plastics, fiberglass, and rubber, styrene is hazardous if mishandled:

1. **Storage Requirements**:
    - Styrene is typically stored as a liquid under temperatures below 20 degree Celsius to prevent vaporization.
2. **Short-Term Exposure**:
    - Can cause respiratory issues, eye and mucous membrane irritation, and gastrointestinal distress.
3. **Long-Term Exposure**:
    - Affects the central nervous system, potentially causing peripheral neuropathy, depression, and even cancer.

4.4. Effects

The Vishakhapatnam gas leak on May 7, 2020, caused widespread devastation due to the uncontrolled vaporization of **2,000 metric tons of styrene** stored at the LG Polymers plant. Styrene, a volatile organic compound, requires stringent storage protocols, with temperatures maintained between **20°C and 22°C** to prevent evaporation. However, a **malfunction in the cooling system** allowed the temperature within the storage tanks to rise uncontrollably, leading to the release of large quantities of toxic styrene vapor.

Effects on Human Health

1. **Immediate Health Impact:**
    - The leaked styrene formed a **dense toxic cloud** that spread over a **3-kilometer radius**, impacting five densely populated villages:
        - Venkatapuram
        - Padmapuram
        - BC Colony
        - Gopalapatnam
        - Kamparapalem
    - Residents experienced severe symptoms shortly after exposure, including:
        - **Respiratory Distress**: Many victims struggled to breathe as styrene vapors irritated the lungs and airways.
        - **Burning Eyes and Dizziness**: The chemical's irritant properties caused eye irritation and dizziness, making it difficult for victims to evacuate.
        - **Unconsciousness**: Prolonged exposure led to fainting, with some individuals collapsing in the streets or within their homes.
2. **Fatalities and Critical Cases:**

- Initial reports confirmed **11 deaths**, with the victims succumbing to acute respiratory failure and toxic exposure.
- Over **25 individuals were reported in critical condition**, requiring intensive medical care.
- The incident affected over **1,000 residents**, many of whom were rushed to hospitals with symptoms ranging from mild to severe.

Environmental and Property Damage

1. **Impact on Vegetation and Livestock:**
   - The chemical vapors caused damage to **local vegetation**, including crops and trees, within the affected radius.
   - Livestock and pets in the vicinity also suffered from exposure, with numerous deaths reported among animals.
2. **Disruption of Daily Life:**
   - The toxic cloud forced residents to evacuate their homes temporarily, leading to widespread panic and chaos.
   - Schools, businesses, and transportation services in the affected areas were disrupted as authorities worked to contain the situation.

Long-Term Effects

1. **Health Complications:**
   - Survivors of the gas leak may experience **long-term health issues**, including chronic respiratory problems, neurological damage, and potential carcinogenic effects linked to styrene exposure.
   - Children and elderly individuals, who are more vulnerable to chemical exposure, face a heightened risk of lasting health complications.
2. **Psychological Trauma:**
   - Many residents reported psychological distress due to the sudden and overwhelming nature of the disaster.
   - Fear and anxiety about future industrial accidents have become prevalent in the affected communities.
3. **Economic Impact:**
   - Local livelihoods were disrupted as residents faced medical expenses, temporary displacements, and loss of income.
   - The environmental damage and disruption to agriculture have had a lasting impact on the local economy.

Broader Implications

The Vishakhapatnam gas leak revealed critical shortcomings in industrial safety and regulatory oversight. The incident highlighted:

- The risks of storing large quantities of hazardous chemicals without adequate monitoring systems.
- The need for comprehensive disaster preparedness and community awareness in areas surrounding industrial plants.
- The devastating consequences of negligence in adhering to environmental and safety standards.

4.5. Investigation

Investigations revealed significant lapses at the plant:

1. **Malfunctioning Cooling Units**:
    - Two storage tanks had been left unattended since March 2020, leading to the failure of cooling mechanisms and subsequent vaporization of styrene.
2. **Negligence in Maintenance**:
    - The plant lacked proper temperature sensors and monitoring equipment, which allowed the leak to go undetected.
3. **Regulatory Violations**:
    - The facility had been operating without valid environmental clearances for over two decades, as confirmed by documents submitted to the Union Ministry of Environment, Forest, and Climate Change.
4. **Legal Action**:
    - An FIR was filed against LG Polymers under multiple sections of the Indian Penal Code, including:
        - Section 278 (Making atmosphere harmful).
        - Section 284 (Negligent conduct with respect to poisonous substances).
        - Section 304 (Culpable homicide not amounting to murder).

4.6. Role of the National Green Tribunal (NGT)

The NGT took *suo moto* cognizance of the case and directed LG Polymers to deposit an initial compensation amount of ₹50 crores with the District Magistrate of Gopalapatnam.

Findings by the NGT Investigation Committee:

- **Outdated Storage Tanks**: The tanks were not equipped with advanced monitoring systems, making it impossible to detect temperature fluctuations or vaporization.
- **Human Error**: The incident was attributed to “gross human failure” and a lack of basic safety norms.
- **Committee’s Recommendations**:
    - Installation of modern safety and monitoring equipment.
    - Comprehensive staff training on handling hazardous substances.

4.7. National Human Rights Commission (NHRC) Response

The National Human Rights Commission (NHRC) viewed the Vishakhapatnam gas leak as a **gross violation of the fundamental right to life**, guaranteed under **Article 21 of the Indian Constitution**. This constitutional provision ensures the protection of life and personal liberty, and the incident was seen as a failure to uphold this essential right for the victims.

In response to the tragedy, the NHRC took proactive steps to address the issues arising from the disaster. Recognizing the widespread human suffering, the Commission issued notices to both the **Andhra Pradesh state government** and the **central government**, demanding accountability and comprehensive action.

Aspects of NHRC's Response

1. **Rescue and Medical Treatment Efforts:**
    - The NHRC sought a detailed account of the immediate rescue operations conducted in the aftermath of the gas leak.
    - It requested specifics on how the affected individuals were evacuated and whether adequate emergency measures were in place to minimize the impact of the disaster.
    - Information on the medical treatment provided to victims was also demanded, particularly regarding the availability of necessary healthcare facilities, the adequacy of resources to handle mass casualties, and the management of critical cases.
2. **Rehabilitation of Victims:**
    - The Commission emphasized the importance of rehabilitating those who suffered long-term physical, emotional, and economic consequences due to the gas leak.
    - It asked the state and central governments to outline measures taken to:
        - Provide financial compensation to the victims and their families.
        - Offer psychological support to those traumatized by the incident.
        - Facilitate the resettlement of affected families, particularly those who had to evacuate their homes due to contamination or health concerns.
3. **Violations of Workplace Health and Safety Laws:**
    - The NHRC raised concerns about potential lapses in compliance with workplace safety standards and environmental regulations.
    - It sought clarity on whether the LG Polymers plant adhered to laws governing the storage and handling of hazardous chemicals, such as:
        - Proper maintenance of storage units.
        - Availability of safety mechanisms like temperature control and leak detection systems.
    - The Commission also asked the authorities to investigate if previous complaints or warnings about the plant's safety were ignored and whether regulatory bodies failed to enforce compliance effectively.

Significance of NHRC's Response

The NHRC's intervention highlighted the importance of ensuring human rights in the context of industrial disasters. By demanding detailed reports, the Commission aimed to:

- Hold the responsible parties accountable for negligence that led to the loss of lives and severe injuries.
- Ensure that affected individuals received adequate relief and compensation.
- Push for systemic changes to prevent similar violations in the future.

This response reinforced the notion that the right to life under Article 21 encompasses more than mere survival; it includes the right to live with dignity, safety, and access to basic necessities such as healthcare and environmental protection.

4.8. Remedial Measures by LG Polymers

In response to the disaster, LG Polymers implemented several measures to prevent future incidents:

1. **Chemical Stabilizers**: Added inhibitors to the storage tanks to reduce the risk of vaporization.
2. **Modernization**: Committed to upgrading storage systems and safety protocols.
3. **Financial Compensation**: Allocated ₹30 crore for compensation to affected families, with ₹1 crore awarded to the families of deceased victims.

CHAPTER-5

LAWS CONCERNING CHEMICAL DISASTERS

India has implemented several laws to safeguard against chemical disasters, particularly after the catastrophic Bhopal Gas Tragedy of 1984.

Legal Framework Before the Bhopal Gas Tragedy

Prior to 1984, the **Indian Penal Code (IPC)** was the primary legal instrument to address incidents involving chemical disasters, focusing on criminal liability for negligence or harm caused. However, the limitations of this framework became apparent in the wake of the Bhopal disaster, necessitating the development of more specialized laws.

Post-Bhopal Legislative Measures

1. **Bhopal Gas Leak Act, 1984**:
    - This law empowered the central government to manage claims related to the tragedy, ensuring justice and compensation for affected individuals.
2. **Environment Protection Act, 1986**:
    - Introduced comprehensive measures to improve environmental standards.
    - Allowed the central government to monitor and regulate industrial operations, especially those involving hazardous substances.
3. **Public Liability Insurance Act, 1991**:
    - Mandated insurance coverage to provide immediate relief to victims of accidents involving

hazardous materials.

4. **National Environment Tribunal Act, 1997**:
    - Established a tribunal to hear appeals regarding the restriction or regulation of industrial activities under the Environment Protection Act, 1986.
5. **National Green Tribunal Act, 2010**:
    - Created the **National Green Tribunal (NGT)** for the swift resolution of environmental disputes.
    - Cases similar to the Bhopal Gas Tragedy are adjudicated under the NGT, using the Environment Protection Act, 1986, as a basis. If a company commits an offense, its responsible officers are presumed guilty unless they prove due diligence or lack of knowledge regarding the violation.

5.1. Measures to Prevent Chemical Disasters

To mitigate the risks of chemical disasters, the following measures should be implemented:

- **Strengthened Regulatory Oversight**: Establishing strict regulatory mechanisms to ensure compliance with safety standards.
- **Comprehensive Safety Plans**: Developing and testing safety protocols regularly.
- **Thorough Pre-Inspection**: Conducting rigorous pre-approval inspections for industrial operations.
- **Capacity Building**: Enhancing the skills and awareness of staff and management through regular training.
- **Risk Assessments**: Continuously analyzing safety vulnerabilities in industrial processes.
- **Provision of Protective Equipment**: Ensuring workers have access to high-quality personal protective gear.
- **Adequate Staffing**: Maintaining sufficient staff levels to handle operations safely.
- **Avoidance of Shortcuts**: Enforcing strict adherence to operational protocols without compromising safety.
- **Regular Inspections and Maintenance**: Conducting routine checks and ensuring proper upkeep of all industrial equipment and systems.
- **Monitoring Safety Measures**: Establishing a robust system to monitor the effectiveness of safety protocols.
- **Organized Workspaces**: Promoting orderly workplaces to reduce risks and streamline operations.
- **Fail-Safe Mechanisms**: Installing advanced safety systems and fail-safe protocols.
- **Alert Systems**: Implementing proper alarm systems to notify workers and nearby communities in case of emergencies.
- **Safety Data Sheets**: Developing detailed safety information sheets for hazardous materials.
- **Hazard and Operability Studies**: Conducting regular assessments to identify and address potential risks in operational processes.

CHAPTER-6

THE DETAILED STUDY

6.1. Detailed study of reports on the most important cases: Oleum gas leak, Bhopal Gas Tragedy and Vizag Gas leak

The **Oleum Gas Leak Case**, formally known as **M.C. Mehta & Anr. v. Union of India & Ors.**, is a landmark judgment that significantly advanced Indian environmental jurisprudence. Decided on December 20, 1986, this case introduced the **Absolute Liability Principle**, replacing the older and more lenient **Strict Liability Doctrine** to ensure stricter accountability for industrial accidents.

Background and Context

The case stemmed from an incident in 1985 at the **Shriram Food and Fertilizer Industries**, situated in a densely populated area of Delhi. The plant specialized in manufacturing hazardous chemicals, including **oleum gas**, **caustic chlorine**, and **sulfuric acid**.

While litigation concerning the plant's operations was pending, a severe accident occurred when **oleum gas** leaked from one of its units. The leak resulted in the death of an individual and caused injuries to several others. The tragedy highlighted the dangers of operating hazardous industries in close proximity to residential neighborhoods and brought attention to gaps in safety protocols and regulatory oversight.

In response to the disaster, **M.C. Mehta**, a social activist and environmental lawyer, filed a **Public Interest Litigation (PIL)** under **Articles 21** (Right to Life) and **32** (Constitutional Remedies) of the Indian Constitution. The PIL demanded the closure of Shriram Industries and compensation for the affected individuals.

Legal Issues Raised

The case raised critical legal and ethical questions:

1. **To what extent should industries engaged in hazardous activities be held liable for harm caused to the public?**
2. **Does the traditional doctrine of strict liability sufficiently address the risks posed by modern industrialization?**
3. **What legal framework should be adopted to balance industrial growth with public safety?**

Judgment and Principle of Absolute Liability

The **Supreme Court of India**, led by Chief Justice P.N. Bhagwati, recognized that the **Strict Liability Doctrine** established in **Rylands v. Fletcher** (1868) was insufficient in the context of modern industrial hazards. The court emphasized that:

- **Strict Liability** allowed for exceptions, such as acts of God, third-party intervention, or the plaintiff's negligence.
- These exceptions undermined the ability to hold industries fully accountable for industrial disasters.

To address these shortcomings, the court introduced the **Absolute Liability Principle**, which held that:

1. Industries engaged in inherently dangerous activities bear an absolute duty to ensure the safety of their operations.
2. If harm occurs, such industries must compensate victims without invoking any defenses or exceptions.

Observations by the Court:

- Industries operating in hazardous sectors owe a social obligation to the communities around them.
- Modern industries have the financial and technical resources to implement fail-safe mechanisms to prevent such accidents.
- Public safety must take precedence over industrial profits.

Impact of the Judgment

1. **Strengthened Accountability**:
    - The Absolute Liability Principle set a higher standard of accountability for industries, ensuring they bear full responsibility for any harm caused by their operations.
2. **Legal Precedent**:
    - This principle became the foundation for subsequent cases involving industrial accidents, including the **Bhopal Gas Tragedy** and the **Vizag Gas Leak**.
3. **Policy Implications**:
    - The judgment spurred legislative changes, such as the **Environment Protection Act, 1986**, and the establishment of regulatory bodies like the **National Green Tribunal (NGT)** to address environmental and industrial safety issues.

Significance of the Case

The Oleum Gas Leak Case marked a paradigm shift in Indian jurisprudence, emphasizing:

- The need for industries to operate responsibly in a society increasingly dependent on industrial growth.
- The role of the judiciary in safeguarding public welfare against corporate negligence.
- The importance of embedding environmental accountability into India's legal framework.

6.2. The Bhopal Disaster: A Detailed Study[25]

[25] 1990 AIR 273 1989 SCC (2) 540 1989 SCALE (1)932

The **Bhopal Gas Tragedy**, which occurred on the night of **December 2-3, 1984**, remains one of the worst industrial disasters in history. The catastrophe unfolded at the **Union Carbide India Limited (UCIL)** pesticide plant in Bhopal, Madhya Pradesh, where a toxic gas, **methyl isocyanate (MIC)**, leaked into the atmosphere. The disaster caused immense loss of life, long-term health consequences, and significant environmental damage, raising critical concerns about corporate accountability and industrial safety.

Background of the Disaster

1. **The Plant and Its Operations**:
    - Established in 1969, the Bhopal plant was a subsidiary of the American multinational **Union Carbide Corporation (UCC)**.
    - The facility manufactured pesticides, primarily **Sevin** (carbaryl), using methyl isocyanate as a key intermediate chemical.
2. **Events Leading to the Leak**:
    - Due to declining demand for pesticides in India, the plant had been operating at reduced capacity by the 1980s.
    - Maintenance and safety standards at the facility had deteriorated over time.
    - On the fateful night, **water inadvertently entered a storage tank containing 42 tons of MIC**, triggering an exothermic chemical reaction.
    - The reaction led to a massive rise in temperature and pressure, releasing large quantities of toxic gas into the atmosphere.

Immediate Impact

1. **Casualties**:
    - The gas leak claimed the lives of approximately **4,000 people within the first few hours**, primarily in the densely populated slums surrounding the plant.
    - The total death toll, including long-term effects, is estimated to exceed **20,000**.
2. **Health Effects**:
    - Over **500,000 individuals** were exposed to the toxic gas, resulting in severe respiratory distress, eye irritation, and gastrointestinal symptoms.
    - Survivors suffered long-term complications such as chronic respiratory diseases, neurological damage, and reproductive disorders.
3. **Environmental Damage**:
    - The leaked gas contaminated the soil and groundwater in the vicinity of the plant, leaving the area uninhabitable for years.

Legal and Corporate Response

1. **Government Action**:
    - The Indian government passed the **Bhopal Gas Leak Disaster (Processing of Claims) Act,**

1985, to consolidate and manage compensation claims.

- It also filed a lawsuit against UCC in the United States, seeking **$3.3 billion** in damages.

2. **Settlement with Union Carbide**:
   - In 1989, UCC agreed to an out-of-court settlement of **$470 million**, which was widely criticized as inadequate given the scale of the disaster.
3. **Accountability Issues**:
   - Key UCC officials, including CEO **Warren Anderson**, were accused of negligence but evaded legal consequences. Anderson was declared an absconder by Indian courts but was never extradited.

Legal and Regulatory Lessons

1. **Introduction of New Laws**:
   - The tragedy prompted the enactment of the **Environment Protection Act, 1986**, aimed at strengthening environmental regulation and industrial safety.
2. **Absolute Liability Principle**:
   - The incident reinforced the need for the **Absolute Liability Doctrine**, as introduced in the **Oleum Gas Leak Case**, ensuring that industries handling hazardous substances are held fully accountable for any harm caused.
3. **Strengthened Oversight**:
   - The disaster highlighted the importance of rigorous safety inspections and regulatory enforcement for hazardous industries.

Long-Term Consequences

1. **Health Impacts**:
   - Generations of survivors continue to suffer from debilitating health conditions, including cancer, birth defects, and mental health issues.
   - The affected community faces ongoing challenges in accessing healthcare and rehabilitation services.
2. **Environmental Challenges**:
   - Toxic waste from the plant remains a significant environmental hazard, with contaminated soil and water continuing to affect the surrounding areas.
3. **Social and Economic Repercussions**:
   - The disaster devastated the local economy, leaving thousands of families in poverty.
   - Trust in industrial safety and corporate responsibility was severely eroded.

Significance of the Bhopal Disaster

The Bhopal Gas Tragedy serves as a grim reminder of the catastrophic consequences of industrial negligence. It underscores the need for:

- **Stringent safety standards** for industries handling hazardous substances.
- **Corporate accountability** and legal frameworks that prioritize the welfare of affected communities.
- **Environmental justice** to address long-term pollution and its impact on public health.

6.2.1. History

The Bhopal Gas Tragedy traces its origins to the **Union Carbide India Limited (UCIL)** pesticide plant in Bhopal, Madhya Pradesh, established in 1969. UCIL was a subsidiary of the American multinational **Union Carbide Corporation (UCC)**. The plant produced pesticides like **Sevin (carbaryl)**, with **methyl isocyanate (MIC)** as a key intermediate.

By the 1980s, the demand for pesticides had declined significantly, leading to reduced operations and cost-cutting measures. These included compromising on safety protocols, reducing maintenance budgets, and deactivating critical safety systems. On **December 2-3, 1984**, a combination of human error, poor maintenance, and systemic negligence resulted in water entering an MIC storage tank. This caused an exothermic chemical reaction, releasing approximately **40 tons of MIC gas** into the atmosphere.

The toxic gas rapidly spread to densely populated areas near the plant, resulting in thousands of immediate fatalities and long-term health complications for survivors.

6.2.2. Aftermath

The immediate aftermath of the Bhopal Gas Tragedy was chaotic and devastating:

1. **Human Toll**:
   - Approximately **4,000 people** died within the first few hours due to acute respiratory failure and exposure to MIC gas.
   - Over **500,000 individuals** were affected, with many suffering from respiratory distress, eye irritation, and neurological damage.
2. **Healthcare System Overwhelmed**:
   - Local hospitals were unprepared for the scale of the disaster. Doctors lacked knowledge about treating chemical exposure, further worsening the situation.
3. **Environmental Damage**:
   - Toxic gas contaminated the surrounding environment, with residual chemicals leaching into the soil and groundwater.
4. **Corporate and Legal Response**:
   - The Indian government passed the **Bhopal Gas Leak Disaster (Processing of Claims) Act, 1985**, allowing it to represent victims in legal proceedings.
   - In 1989, UCC settled for **$470 million**, a figure criticized for being grossly inadequate given the magnitude of the disaster.

6.2.3. Dead Administration

The tragedy exposed significant failures in administrative and regulatory oversight:

1. **Negligence in Enforcement**:
    - Regulatory authorities failed to ensure that UCIL adhered to safety standards. Despite previous complaints and warnings, the plant's safety systems remained inadequate.
2. **Unpreparedness**:
    - Local authorities and emergency services were ill-equipped to handle an industrial disaster of this scale, resulting in delayed and inefficient rescue efforts.
3. **Lack of Accountability**:
    - Key decision-makers, including **Warren Anderson**, the then-CEO of UCC, evaded accountability. Anderson was declared an absconder by Indian courts but was never extradited to face charges.
4. **Inadequate Compensation Mechanisms**:
    - The settlement amount was insufficient to address the long-term medical and economic needs of the victims and their families.

6.2.4. Public Protest

The Bhopal Gas Tragedy ignited widespread public outrage and protests:

1. **Demand for Justice**:
    - Survivors and activists demanded stricter legal action against UCC and adequate compensation for victims.
2. **Grassroots Movements**:
    - Organizations like the **Bhopal Gas Peedith Mahila Udyog Sangathan** and the **Bhopal Group for Information and Action** emerged to advocate for survivors' rights.
3. **Global Attention**:
    - The tragedy garnered international attention, pressuring both the Indian government and UCC to take responsibility.
4. **Resistance to Dow Chemical**:
    - In 2001, UCC was acquired by Dow Chemical, which refused to accept liability for the Bhopal disaster. This further fueled protests demanding corporate accountability.

6.2.5. Lessons Learned

The Bhopal Gas Tragedy underscored the critical need for systemic changes in industrial operations and regulatory frameworks:

1. **Stronger Regulations**:
    - The tragedy led to the enactment of the **Environment Protection Act, 1986**, and the establishment of bodies like the **National Green Tribunal (NGT)** to oversee industrial safety.
2. **Introduction of Absolute Liability**:
    - The principle of **Absolute Liability**, introduced in the **Oleum Gas Leak Case**, ensured that

industries handling hazardous substances would be held fully accountable for any harm caused, regardless of negligence.

3. **Disaster Preparedness**:
    - The need for comprehensive emergency response plans and public awareness campaigns became evident.
4. **Corporate Accountability**:
    - The tragedy highlighted the importance of holding multinational corporations accountable for their operations, particularly in developing countries.

6.2.6. Since 1984

The legacy of the Bhopal Gas Tragedy continues to shape environmental and industrial policy in India:

1. **Health and Environmental Challenges**:
    - Decades after the incident, toxic waste from the UCIL plant remains untreated, contaminating soil and groundwater.
    - Survivors continue to suffer from chronic health conditions, including cancer, respiratory diseases, and birth defects.
2. **Legal Reforms**:
    - The disaster prompted significant legal reforms, including stricter penalties for industrial negligence and mandatory environmental clearances for hazardous industries.
3. **Continued Activism**:
    - Survivors' groups and activists remain vocal, demanding justice, compensation, and the cleanup of toxic waste.
4. **Global Lessons**:
    - The Bhopal tragedy serves as a case study for industrial safety worldwide, emphasizing the need for robust regulations and corporate accountability.

6.3. Vizag Gas Leak[26]

The gas leak incident in **Visakhapatnam**, Andhra Pradesh, on the early morning of **May 7, 2020**, was not an isolated industrial accident. On the same day, in the evening, boilers exploded at **NLC India Limited's thermal station** in Neyveli, Tamil Nadu, injuring eight people. A day earlier, on May 6, a similar gas leak accident occurred at a factory in Raigarh, Chhattisgarh, hospitalizing seven workers.

A common thread among these incidents was the **poor operational and maintenance practices** during the COVID-19 lockdown, compounded by the absence of skilled workers. These factors played a critical role as factories prepared to reopen post-lockdown, leading to avoidable industrial mishaps.

[26] 1990 AIR 273, 1989 SCC (2) 540

Details of the Vizag Gas Leak Incident

The Vizag facility, operated by **LG Polymers**, used **styrene (C8H8)**, a volatile organic compound, to manufacture expandable plastics. Styrene must be stored at temperatures below **17°C** to prevent vaporization.

During the COVID-19 lockdown, the plant experienced a **temporary partial shutdown**, except for ongoing maintenance activities. However, the **inadequate cooling of the styrene storage tanks** caused the temperature to rise beyond safe limits, leading to a **build-up of pressure** inside the storage chamber. This pressure eventually caused the **valve to rupture**, releasing approximately **3 tons of toxic styrene gas** into the atmosphere.

Extent of Styrene Contamination

1. **Immediate Air Contamination**:
    - On the day of the leak, the concentration of styrene in the air was reported to be **500 times higher than the prescribed safe limit**.
    - Media reports indicated that styrene levels in the affected area reached **2,500 parts per billion (ppb)**, while the **World Health Organization (WHO)** stipulates that styrene concentrations should not exceed **5 ppb**.
2. **Impact Radius**:
    - The facility spans approximately **240 hectares**, including proximity to **residential areas** and a revenue village, significantly increasing the number of individuals exposed to the toxic gas.
3. **Findings from the Centre for Science and Environment (CSE)**:
    - Styrene levels in the vicinity of the plant on May 7 were recorded at **2.5 parts per million (ppm)—2,500 times higher** than the permissible limit of **5 ppb**.
    - According to analysis, the levels of styrene in the air could have exceeded **20 ppm** up to a distance of **2 km** from the plant during the hour-long leak, causing people to lose consciousness.

Scientific Analysis of the Leak

- **Pollutant Dispersion Study**:
    - A study conducted by the **Indian Institute of Technology (IIT), Mumbai**, modeled the leak assuming the **storage tank capacity** to be 3 tons and the release occurring through a **10 cm diameter gap** over an hour.
    - The study concluded that such high concentrations of styrene gas in the air caused widespread health issues, including unconsciousness and respiratory distress.
- **Additional Pollutants Monitored**:
    - The **Central Pollution Control Board (CPCB)** monitors three major volatile organic compounds (VOCs) in the Visakhapatnam district:
        - **Xylene (C8H10)**: Levels reached **18 ppb**.

- **Toluene (C7H8)**: Levels peaked at **35 ppb**.
- **Benzene (C6H6)**: Recorded concentrations up to **12 ppb**.

- These figures far exceeded levels recorded in **Amaravati**, Andhra Pradesh's capital, located about **400 km south of Visakhapatnam**.

Historic Data and Patterns

1. **Regular VOC Presence in Visakhapatnam Air**:
   - The CSE's analysis revealed that elevated levels of VOCs are a recurring phenomenon in Visakhapatnam's ambient air, indicating the **prevalence of industrial emissions** in the region.
2. **CPCB Air Quality Standards**:
   - According to the **CPCB ambient air quality standards**, the acceptable annual average for hydrocarbons in the air is **5 ppb**. The levels recorded during and after the Vizag gas leak were significantly higher, signaling long-standing issues with air quality in the region.

6.3.1. How the Corporation Bypassed Safety Rules

Industries involved in processing petrochemical-based products, such as styrene, are required to obtain two levels of clearances: an **Environmental Clearance (EC)** from the Union Ministry of Environment, Forest, and Climate Change (MoEF&CC), and a **Consent to Operate (CTO)** from the respective State Pollution Control Board (SPCB). The CTO must be renewed every five years and provides essential guidelines, including production limits, permissible treated effluent levels, and air quality standards around the factory premises. However, **LG Polymers India** failed to comply with these regulations at both levels.

Since the company had been operational since the 1960s, long before the **Environmental Impact Assessment (EIA) Notification of 2006**, it was not initially required to obtain an EC unless it expanded its production capacity, changed raw materials, or modernized its facilities. Despite this, LG Polymers made significant expansions and alterations to its production processes starting in 2004 without seeking the necessary EC.

Expansion Without Clearance

The company significantly increased its production capacity over the years:

- In 2004, the plant's expandable polystyrene capacity was **45 tons per day (TPD)**, which increased to **65 TPD in 2009**, **71.5 TPD in 2012**, and finally **100 TPD in 2014**.
- Similarly, its styrene production capacity increased from **235 TPD in 2014** to **315 TPD in 2017**.

In 2017, the **Andhra Pradesh Pollution Control Board (APPCB)** warned LG Polymers about the need for an EC, stating it would not grant further CTO renewals without it. In response, the company filed a petition with MoEF&CC seeking an EC. It also proposed to the APPCB that it was importing plastic granules to produce expandable plastics, which, according to its claim, did not require an EC. Using this justification, LG Polymers managed to secure consent from the APPCB without undergoing an

environmental impact assessment. In 2018, the company withdrew its EC application from MoEF&CC, citing errors in the documentation.

Violation of Environmental Guidelines

The company's failure to seek an EC violated two critical requirements:

1. **Changes in Product Mix and Associated Risks**:
    - Alterations in the product mix meant changes in the nature of raw materials and manufacturing risks, particularly involving hazardous chemicals.
    - Expansion of production implied increased storage and handling risks, especially during transportation and port operations.
2. **Impact Assessment Studies**:
    - The expansions and production changes demanded comprehensive impact assessment studies, which the company bypassed.

According to **DD Basu**, an advisor with the Centre for Science and Environment (CSE), these expansions and material changes introduced entirely new risks that required a fresh application for clearance. Simply renewing the CTO was insufficient.

Neglect of CTO Conditions

LG Polymers failed to adhere to several general conditions stipulated under its CTO:

- **VOC Monitoring and Leak Detection Systems**:
    - The plant was required to maintain **Volatile Organic Compound (VOC) analyzers** with recording capabilities and keep detailed records.
    - A functional leak detection system was also mandated to immediately address any leaks in the plant's pumps and equipment.

However, according to an APPCB official, the VOC detection system at the plant was **non-functional**, and no mechanism was in place to specifically monitor styrene levels. Additionally, the storage equipment for styrene gas was outdated and poorly maintained, further compounding the risks.

Regulatory Negligence

After the **Bhopal Gas Tragedy of 1984**, India enacted several laws aimed at preventing such disasters and ensuring safe storage of hazardous chemicals. Key legislations include:

1. The **Environment (Protection) Act, 1986**, which gives the central government sweeping powers to protect the environment.
2. Specific rules under the Act:
    - **Hazardous Waste (Management, Handling, and Transboundary Movement) Rules, 1989**.
    - **Manufacture, Storage, and Import of Hazardous Chemicals Rules, 1989**.
    - **Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996**.

Despite these legal frameworks, the Vizag gas leak revealed glaring negligence on the part of multiple stakeholders, including the company and regulatory authorities.

Protocol Violations by LG Polymers

The plant, certified as an **ISO-compliant facility**, was expected to follow stringent protocols for all operations. However, the management neglected critical maintenance and operational procedures in its haste to resume operations following the COVID-19 lockdown. This disregard for protocol, coupled with systemic safety lapses, culminated in the tragic gas leak incident.

6.3.2 NGT's Actions and Observations

In its directive, the **National Green Tribunal (NGT)** issued notices to multiple parties, including the **Andhra Pradesh Pollution Control Board (APPCB)**, the **District Magistrate of Visakhapatnam**, the **Central Pollution Control Board (CPCB)**, the **Ministry of Environment, Forest, and Climate Change (MoEF&CC)**, and **LG Polymers India Pvt. Ltd.** The notices sought detailed responses regarding the cause of the accident, its impacts, and the actions taken to mitigate harm.

Additionally, the tribunal established a **five-member expert committee** to investigate the incident. The committee members included:

1. **B. Seshasayana Reddy**, a former judge of the Andhra Pradesh High Court.
2. **V. Rama Chandra Murthy**, a former vice-chancellor of Andhra University.
3. **Pulipati King**, the head of the Department of Chemical Engineering at Andhra University.
4. The **Member Secretary of the CPCB**.
5. The **Director of the Council for Scientific and Industrial Research-Indian Institute of Chemical Technology (CSIR-IICT)**.

The committee was tasked with preparing an **initial report** within **10 days**, detailing:

- The cause of the gas leak.
- The extent of damage caused by the incident.
- The remedial measures undertaken to address the situation.

Potential Precedent

While the NGT's prompt action is commendable, its order raises critical questions about its long-term implications. If implemented effectively, the order could serve as a **precedent for addressing and preventing industrial disasters** in the future. However, the scope of the order appeared limited, as it did not include the **other two industrial accidents** that occurred around the same time—the boiler explosion in Neyveli, Tamil Nadu, and the gas leak in Raigarh, Chhattisgarh.

Additionally, there was ambiguity in the order regarding the **utilization of ₹50 lakh** directed to the District Magistrate. It was unclear whether this amount could be immediately used for relief measures for the affected communities or would be subject to further procedural requirements.

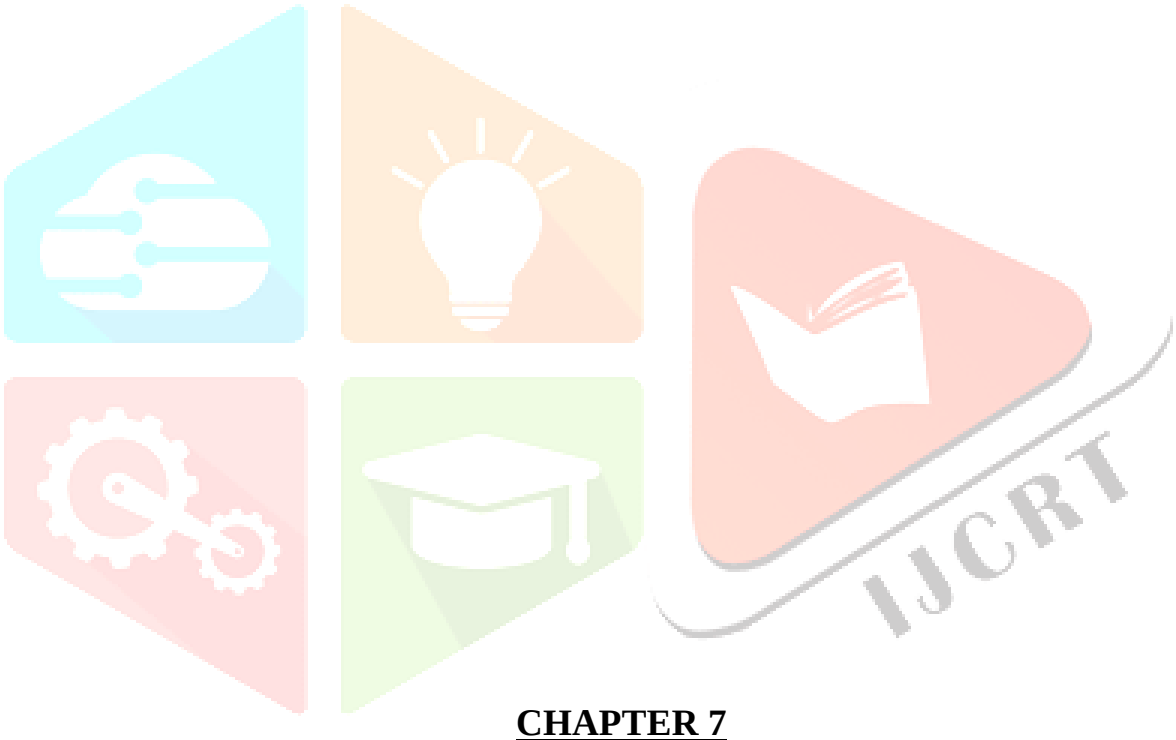
Need for Broader Action

The NGT's acknowledgment of the **Visakhapatnam gas leak** is a positive step. However, the tribunal could have taken a more expansive approach by directing the government to issue an **immediate directive to industries nationwide**. Such a directive could have ensured:

1. Implementation of safety protocols while restarting operations.
2. Regular inspections and audits to prevent similar incidents.

As industries resumed activities following the COVID-19 lockdown, the necessity for heightened vigilance became increasingly evident. The Visakhapatnam incident, along with other industrial accidents, underscored the critical need to prioritize safety during the transition to normal operations.

By expanding its scope, the NGT could have emphasized the importance of proactive safety measures, ensuring that industrial operations do not compromise human lives or environmental integrity in the future.



CHAPTER 7

THE CRITICAL STUDY WITH REFERENCE TO INDIAN LAWS

7.1. Surge in Industrial Accidents in India

India's rapid industrial growth has been accompanied by a worrying increase in industrial accidents and fatalities. Between **2014 and 2016**, factory accidents resulted in **3,562 deaths** and over **51,000 injuries**, according to the Ministry of Labour and Employment. This equates to an alarming **average of three deaths and 47 injuries every day**.

Regional Impact

1. **Fatal Accidents**:
    - **Gujarat**, **Maharashtra**, and **Tamil Nadu** together accounted for **41%** of total fatalities in

factory accidents during this period.

2. **Non-Fatal Injuries**:
    - **Andhra Pradesh** reported the **highest share** of non-fatal injuries, accounting for **64.89%** of such cases.
    - Combined with Maharashtra and Gujarat, these states contributed to **80%** of the country's non-fatal injuries in factory accidents.

Chemical Accidents and Major Accident Hazard (MAH) Units

According to the **National Disaster Management Authority (NDMA)**, over **130 major chemical accidents** have been reported in India in recent years, resulting in:

- **259 deaths**.
- Major injuries to more than **560 individuals**.

India has **1,861 Major Accident Hazard (MAH) units**, distributed across **301 districts**, **25 states**, and **three Union Territories**. These units deal with hazardous chemicals and pose significant risks if not managed properly.

In addition to MAH units, thousands of factories across both organized and unorganized sectors handle dangerous substances, further increasing the risk of industrial disasters.

Notable Industrial Accidents in the Past Five Years

1. **2014: GAIL Pipeline Blast**
    - On **June 27, 2014**, a devastating fire erupted following a pipeline explosion at Nagaram in East Godavari District, Andhra Pradesh. The underground gas pipeline was managed by the **Gas Authority of India Limited (GAIL)**.
2. **2014: Bhilai Steel Plant Gas Leak**
    - In **June 2014**, six people died, and over 40 were injured due to a **methane gas leak** in a pipeline at the Bhilai Steel Plant in Chhattisgarh's Durg district.
3. **2017: Delhi Gas Leak**
    - A **chemical leak** at a container depot in Delhi, located near two schools, resulted in the hospitalization of **470 children**.
4. **2018: Bhilai Steel Plant Blast**
    - A major explosion at the **state-owned Bhilai Steel Plant** killed **nine people** and injured **14 others**.
5. **2019: Chemisynth Chemical Factory Explosion**
    - On **August 28, 2019**, a chemical-filled barrel exploded in a factory in Dhule, Maharashtra. The incident triggered a chain reaction of explosions involving other barrels and oxygen cylinders, killing **13 workers** and injuring **72 others**.
    - Local residents had complained about foul fumes emanating from the factory weeks before the accident, but their warnings were ignored.

6. **2019: ONGC Plant Fire**
    - A massive fire broke out at an **ONGC facility** off the coast of Mumbai, killing **four people** and injuring at least three others.

Observations

The data reveals the following critical patterns:

- **Negligence**: Many of these incidents could have been avoided with stricter safety protocols and better regulatory enforcement.
- **Repeated Warnings Ignored**: Several accidents, such as the **Chemisynth explosion**, occurred despite prior complaints and warnings, highlighting systemic negligence.
- **Insufficient Preparedness**: The lack of adequate disaster response mechanisms and safety training for workers exacerbates the impact of industrial accidents.

These incidents underscore the urgent need for robust enforcement of safety laws, regular audits of hazardous industries, and improved disaster management strategies. By addressing these gaps, India can better protect its workforce and mitigate the risks associated with industrial growth.

7.2. Laws and Legalities on Industrial Accidents

The rising number of industrial accidents in India has caused significant loss of life, severe injuries, destruction of property, and environmental degradation. These alarming events highlight the urgent need for **stricter norms** and **comprehensive legal provisions** to prevent such occurrences. While India already has numerous laws and regulations to ensure industrial safety, enforcement and compliance remain areas of concern. Penalties for violations and liabilities for industrial accidents are clearly outlined in the legal framework, but their effectiveness depends on proper implementation.

7.2.1. Provisions Under the Indian Penal Code (IPC)

The **Indian Penal Code (IPC)**, India's comprehensive criminal code, governs offenses and prescribes penalties for criminal acts, including those related to industrial accidents. Several sections of the IPC address negligence, recklessness, and endangerment in the context of industrial operations.

Relevant IPC Sections Pertaining to Industrial Accidents:

1. **Section 278**: *Making the atmosphere noxious to health*
    - Penalizes acts that render the atmosphere harmful to public health.
    - This section is particularly relevant when toxic emissions or leaks from industries adversely impact the surrounding environment and residents.
2. **Section 284**: *Negligent conduct with respect to poisonous substances*
    - Targets the mishandling of hazardous chemicals and substances.
    - Industries that fail to store, transport, or manage toxic substances safely are held accountable under this section.
3. **Section 285**: *Negligent conduct with respect to fire or flammable matter*

- Addresses the failure to take precautions in handling or storing flammable materials, which could result in fires or explosions.

4. **Section 304**: *Culpable homicide not amounting to murder*
   - Applies when an industrial accident results in fatalities due to gross negligence or reckless behavior.
5. **Section 304A**: *Death caused by negligence*
   - Specifically deals with deaths caused by negligence, imposing a **maximum penalty of two years imprisonment** and a fine.
   - Frequently invoked in cases where industrial accidents lead to fatalities, but there is no intent to cause harm.
6. **Section 337**: *Causing hurt by an act endangering life or personal safety of others*
   - Penalizes acts that result in injuries due to negligence or reckless endangerment of life.
7. **Section 338**: *Causing grievous hurt by an act endangering life or personal safety of others*
   - Applies to cases where negligent actions result in severe or life-threatening injuries.

Significance of IPC in Industrial Safety

The IPC provides a robust framework to address negligence and accountability in industrial operations. By imposing penalties and imprisonment, these provisions aim to:

- Deter industries from adopting lax safety practices.
- Ensure personal accountability for management and personnel involved in hazardous operations.
- Provide legal recourse for victims of industrial disasters.

However, while the IPC lays out penalties, enforcement and timely prosecution are critical to ensuring justice and deterring future violations. The legal framework must be complemented by stringent inspections, regular audits, and proactive measures to mitigate risks in industries handling hazardous materials.

7.2.2. Provisions Under Various Environmental Laws

In response to the **Bhopal Gas Tragedy of 1984**, the Indian Parliament enacted several laws to safeguard the environment and regulate industrial activities involving hazardous substances. These laws aim to mitigate risks, ensure compliance with safety protocols, and hold industries accountable for negligence[27].

Environment (Protection) Act, 1986

The **Environment (Protection) Act, 1986**, is an overarching law that grants extensive powers to the Union government to take necessary measures to protect and improve the environment. It empowers the authorities to impose restrictions on industrial activities, regulate emissions and effluents, and enforce environmental standards. The Act serves as a foundation for other environmental laws and rules.

Environment (Protection) Rules, 1986

[27] https://www.thequint.com/news/law/vizag-gas-leak-legal-responsibility-lg-polymers-absolute-liability-supreme-court-oleum-bhopal-gas-cases

Complementing the Act, the **Environment (Protection) Rules, 1986**, establish standards for:

- **Discharge of pollutants**: Sets limits for industrial discharges into air, water, and soil.
- **Product standards**: Ensures manufactured products meet environmental quality benchmarks.
- **Ambient air and water quality**: Monitors the surrounding environment for compliance with defined standards.

These rules provide a framework for maintaining ecological balance and mitigating the adverse impacts of industrialization.

Hazardous Waste (Management, Handling, and Transboundary Movement) Rules, 1989

These rules govern the entire lifecycle of hazardous waste, from its generation and collection to treatment, storage, and disposal. Industries are required to identify major accident hazards, implement preventive measures, and report incidents to designated authorities. The rules also regulate the import and export of hazardous waste, ensuring compliance with international norms.

Manufacture, Storage, and Import of Hazardous Chemicals Rules, 1989

This regulation provides comprehensive guidelines for handling hazardous chemicals. It defines critical terms and establishes a statutory authority to oversee industrial operations involving hazardous substances.

- Industries must furnish detailed product safety information to the competent authorities.
- Imported chemicals must be transported, stored, and used in compliance with prescribed safety standards.
- The authority conducts annual inspections of facilities to ensure compliance.

These rules aim to minimize risks associated with hazardous substances and prevent industrial disasters.

Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996

These rules provide a legal basis for creating **Crisis Groups** at the district and state levels to manage major chemical accidents. The rules emphasize:

- The formation of **Central Crisis Groups (CCG)** and **State Standing Crisis Groups (SSCG)**.
- Preparing and updating on-site and off-site emergency plans.
- Conducting mock drills to test preparedness and identify gaps in response strategies.
- Establishing a **Crisis Alert System** for quick response to emergencies.

These provisions ensure that states and districts with **Major Accident Hazard (MAH) installations** are equipped to handle chemical disasters effectively.

7.2.3. Provisions Under Judicial Scrutiny

The **National Green Tribunal (NGT) Act, 2010**, is a landmark legislation that established specialized environmental courts to address issues related to environmental protection. Drawing its mandate from **Article 21 of the Indian Constitution**, which guarantees the right to life and a healthy environment, the NGT ensures swift resolution of environmental disputes.

Role of the NGT

The NGT was created to address environmental concerns efficiently and expedite hearings to ensure timely

justice. Its jurisdiction covers cases arising from several key regulations, including:

- **The Water (Prevention and Control of Pollution) Act, 1974**.
- **The Forest (Conservation) Act, 1980**.
- **The Air (Prevention and Control of Pollution) Act, 1981**.
- **The Environment (Protection) Act, 1986**.
- **The Public Liability Insurance Act, 1991**.
- **The Biological Diversity Act, 2002**.

By consolidating environmental matters under one specialized body, the NGT has streamlined the legal process for addressing industrial accidents and environmental violations.

Application in Industrial Accidents

In cases like the **LG Polymers gas leak in 2020**, the NGT demonstrated its authority by invoking multiple provisions under environmental laws:

- Sections 14 and 15 of the NGT Act were used to direct the company to pay **₹50 crore** as compensation based on the extent of damage and the company's capacity to pay.
- The tribunal relied on **Rule 13 of the Manufacture, Storage, and Import of Hazardous Chemicals Rules, 1989**, which mandates on-site emergency plans and places the responsibility of safety on the occupier.

Evolution of Environmental Jurisprudence

Before the enactment of the NGT Act, environmental cases were heard in regular courts or under limited frameworks, such as the **National Environmental Tribunal Act, 1995**, and the **National Environmental Appellate Authority Act, 1997**. These earlier laws had narrower mandates, focusing mainly on violations of environmental clearances granted by the Ministry of Environment and Forests.

The NGT Act replaced these laws, providing a broader mandate and greater enforcement powers. By holding industries accountable for their actions and ensuring compensation for affected individuals, the NGT has become a cornerstone of India's environmental justice system.

7.2.4. Laws Governing Factories and Industrial Accidents

Industrial safety in India is governed by multiple laws designed to safeguard workers and ensure secure operating conditions. Two pivotal laws, **The Factories Act, 1948**, and its amended version, **The Factories (Amendment) Act, 1987**, form the foundation of India's industrial safety regulations.

The Factories Act, 1948

This Act marked the beginning of formal legal concern for workers' health and safety in India. It laid down provisions to improve workplace conditions and addressed critical aspects such as employee welfare, health standards, and accident prevention.

The Factories (Amendment) Act, 1987

The 1987 amendment to the original Act brought a sharper focus on environmental considerations and significantly expanded the law's application to hazardous industries. It introduced:

- **Regulations for Hazardous Units**: Provisions to oversee the establishment of industrial units

handling dangerous materials.

- **Safety and Disaster Preparedness**: Requirements for creating on-site emergency response plans and disaster management strategies to protect employees and nearby communities.

Model Rules under the Factories Act, 1948 (Amended 1987)

These rules detail specific safety protocols, including both on-site and off-site emergency planning. **Chapter IX** of these rules outlines the standards for "dangerous manufacturing processes or operations" and mandates:

- Immediate reporting of accidents or hazardous occurrences.
- Development and execution of comprehensive safety and disaster management plans.

The Public Liability Insurance Act, 1991

This Act ensures immediate relief for victims of accidents involving hazardous substances. It imposes **no-fault liability**, meaning the owner of a hazardous industry is liable to compensate victims regardless of negligence or fault.

Provisions include:

- Mandatory insurance policies to cover potential liabilities.
- Prompt compensation to victims without requiring proof of fault or negligence.

While these laws are robust, their enforcement remains a challenge. The implementation of safety protocols often depends on factory management, and negligence by occupiers frequently leads to accidents. Despite this framework, over **46,000 prosecutions** were initiated in three years due to violations of safety standards, resulting in **29,911 convictions**.

7.3. Relevant Legal Principles

India's legal framework governing industrial accidents is rooted in established principles of liability, specifically **absolute liability** and **strict liability**. These principles serve as the cornerstone of industrial disaster jurisprudence, ensuring accountability and fair compensation for victims.

A. Principle of Absolute Liability

The principle of absolute liability was developed to address the inadequacies of older doctrines like strict liability. It mandates that any enterprise involved in inherently hazardous activities is **fully liable** for any harm caused by its operations, regardless of precautions taken or the presence of unforeseen events.

Features:

1. **No Exceptions**:
    - Enterprises cannot invoke defenses such as "Acts of God" or third-party interference.
    - The responsibility for compensation remains absolute, even if negligence cannot be proven.
2. **Comprehensive Accountability**:
    - The enterprise is held accountable for all damages, ensuring victims receive adequate compensation.
    - This principle compels industries to implement the highest safety standards and provide protective equipment to employees.

3. **No Escape Clause**:
    - Even if an incident occurs within industrial premises (e.g., toxic fumes affecting workers but not escaping the site), the company is still liable to compensate affected employees.

By holding enterprises strictly accountable, the principle of absolute liability prioritizes the safety of workers and the surrounding community while setting a high bar for industrial operations.

B. Principle of Strict Liability

Strict liability, as defined in older legal doctrines, holds an entity accountable for damages caused by the escape of dangerous substances from its premises. However, this principle allows for certain exceptions, making it less stringent than absolute liability.

Key Components:

1. **Dangerous Substances**:
    - The liability applies only if the escaped substance is inherently hazardous and capable of causing significant harm (e.g., toxic fumes, chemicals, or explosives).
2. **Escape Requirement**:
    - The harmful substance must leave the control or premises of the entity responsible for it to invoke strict liability.
3. **Non-Natural Use of Land**:
    - If the hazardous activity constitutes a non-natural use of land, liability arises for any damage caused. For instance, storing chemicals in vast quantities or cultivating poisonous plants would be considered non-natural use.[28]
4. **Exceptions**:
    - Strict liability does not apply in cases involving "Acts of God," third-party interference, or the plaintiff's own negligence.

While strict liability offers a structured approach to handling industrial accidents, its limitations—especially the availability of defenses—often dilute its effectiveness in holding industries accountable.

Comparative Analysis of Absolute and Strict Liability

- **Absolute Liability**:
    - Introduced by the Supreme Court of India in **M.C. Mehta v. Union of India (1987)**, this principle eliminates the need for proving negligence or the applicability of exceptions.
    - Under the **NGT Act, 2010**, absolute liability is explicitly incorporated, requiring courts to apply this doctrine even in accidental disasters.
- **Strict Liability**:
    - Originating from **Rylands v. Fletcher (1868)**, this principle is less stringent, allowing

[28] https://economictimes.indiatimes.com/news/politics-and-nation/lg-polymers-india-has-absolute-liability-for-gas-leak-says-ngt/articleshow/76172925.cms

exceptions for unforeseen events or external factors.

In cases like the **LG Polymers Gas Leak**, the NGT applied absolute liability to ensure that the company bore full responsibility for the disaster. The tribunal also invoked **Rule 13 of the Manufacture, Storage, and Import of Hazardous Chemicals Rules, 1989**, which mandates on-site emergency planning and holds occupiers accountable for lapses.

7.3 Why Additional Authorization of Regulatory and Legal Systems is Needed

Despite India's growing industrialization and the alarming rise in industrial accidents, the regulatory and legal systems remain inadequate to establish effective safety protocols and hold perpetrators accountable. Although there have been judicial interventions and legislative efforts, the implementation and enforcement of these measures are insufficient to address recurring safety violations and prevent future disasters. Strengthening both regulatory frameworks and legal systems is essential not only to prevent accidents but also to ensure that those responsible face exemplary penalties.

7.4. Legal Framework: Gaps and Reforms Needed

The current set of industrial safety laws in India, while comprehensive, leans heavily towards **civil liability** rather than **criminal prosecution**. Although there are provisions for initiating criminal proceedings for industrial accidents, they are rarely enforced. The justice system's focus on compensations, especially in cases heard by the National Green Tribunal (NGT), limits its ability to fully address the gravity of the offenses.

1. **Compensation-Oriented Outcomes**:
    - Most NGT cases result in monetary compensation, typically awarded in two stages:
        - An **initial relief amount**, based on rough estimates, is provided at the beginning of the case to offer immediate assistance to victims.
        - A **final settlement**, determined after a detailed examination of facts and damages, is awarded later.
    - While compensation provides relief to victims, it often fails to address the underlying negligence and accountability of those responsible for the accident.
2. **Lack of Criminal Accountability**:
    - Fixing responsibility for industrial accidents usually involves targeting the corporation as a whole rather than the individual employees whose negligent actions may have directly caused the disaster.
    - The most severe consequence for employees in such cases is often **suspension or termination**, which is insufficient to deter future negligence.
3. **Need for Criminal Prosecution**:
    - It is crucial to prosecute individuals whose reckless or negligent behavior leads to industrial accidents. Such accountability under criminal law can serve as a strong deterrent against negligence and complacency.

Empowering the National Green Tribunal (NGT)

The **National Green Tribunal (NGT)** plays a critical role in addressing environmental violations and industrial disasters. However, its powers remain limited, restricting its effectiveness as a deterrent.

1. **Quasi-Judicial Nature of NGT**:
    - The NGT operates as a quasi-judicial body, which means it has authority similar to that of law enforcement agencies but lacks the comprehensive powers of a traditional court.
    - While the NGT can impose penalties on administrative agencies and recommend punitive measures for offenders, its judgments can be challenged in higher courts, which hold the final authority.
2. **Limitations in Criminal Matters**:
    - The NGT does not have the authority to prosecute individuals for criminal offenses. Its role is primarily confined to making **recommendations** for penal action based on the nature and severity of the offense.
    - This limits the tribunal's ability to act as an effective deterrent against industrial negligence and violations.
3. **Proposed Reforms for the NGT**:
    - To strengthen the deterrence system, the NGT should be granted broader powers, including:
        - The authority to directly prosecute individuals and entities responsible for industrial accidents.
        - Enhanced enforcement capabilities to ensure compliance with safety regulations.
        - Greater autonomy to function without excessive reliance on other judicial bodies.[29]

The Need for a Stronger Deterrence System

India's existing regulatory framework falls short in holding individuals and corporations accountable for industrial disasters. Strengthening this system requires a combination of reforms:

- **Criminal Prosecution**:
    - Individuals responsible for negligence must face criminal charges in addition to civil liabilities.
    - This can be achieved by integrating criminal law provisions into industrial safety regulations and ensuring their enforcement.
- **Strengthening the NGT**:
    - Empowering the NGT with greater judicial authority would enable it to impose stricter penalties and prosecute offenders without unnecessary delays.
    - Expanding the NGT's jurisdiction to address criminal matters could reduce the burden on

[29] https://www.casemine.com/judgement/uk/5a938b3d60d03e5f6b82b9ef

regular courts and ensure swifter resolution of cases.

- **Accountability for Corporations and Employees**:
  - Legal provisions should ensure that both corporations and individuals within the organization are held accountable for negligence, with penalties reflecting the severity of the offenses.

7.5. Regulatory Framework

India's regulatory mechanisms for preventing industrial accidents and enforcing safety standards are inadequate, leaving significant gaps in the effective implementation of laws. A robust regulatory framework is essential to ensure strict compliance with safety protocols, thereby reducing the frequency of industrial accidents and their devastating consequences.

At present, the country lacks a **strong regulatory body** with the authority and resources needed to enforce industrial safety laws comprehensively. To address this issue, the following enhancements are urgently required:

1. Granting Greater Autonomy to State Pollution Control Boards (SPCBs)

The **State Pollution Control Boards (SPCBs)** are responsible for overseeing industrial operations and ensuring compliance with environmental and safety regulations. However, their effectiveness is often hindered by external influences and micromanagement.

- **Proposed Solution**:
  - Provide SPCBs with **greater autonomy**, enabling them to operate independently without undue interference.
  - Strengthen their decision-making powers to ensure unbiased enforcement of regulations.

2. Increasing Resources for SPCBs

Many SPCBs face a shortage of personnel and funding, limiting their ability to perform regular inspections and enforce compliance.

- **Proposed Solution**:
  - Increase the **workforce and financial resources** allocated to SPCBs.
  - Enable comprehensive and frequent inspections of industries, with a particular focus on **high-risk facilities**.

3. Enhancing Monitoring Systems

Improved monitoring, both within industrial premises and in their surrounding areas, is crucial for early detection of potential risks.

- **Proposed Solution**:
  - Develop a standardized **protocol for monitoring and reporting** incidents.
  - Introduce real-time monitoring systems to detect irregularities and promptly address unforeseen events that could lead to accidents.

4. Strengthening Self-Monitoring and Reporting by Industries

Industries are currently required to self-monitor and report compliance with safety and environmental standards. However, this system is often exploited, leading to non-compliance going unnoticed.

- **Proposed Solution**:
  - Enforce **stricter guidelines** for industries to adhere to self-monitoring frameworks.
  - Introduce **randomized audits** and penalties for non-compliance to ensure accountability.

5. Mandating Regular Audits for High-Risk Industries

High-risk industries pose a greater threat to public safety and the environment, making regular and detailed audits essential.

- **Proposed Solution**:
  - Require **frequent safety audits** for industries classified as high-risk.
  - Conduct independent third-party inspections to eliminate biases in the auditing process.

6. Re-Designing Inspection Protocols

The current inspection protocols are often outdated and lack coordination among various regulatory bodies.

- **Proposed Solution**:
  - **Modernize inspection protocols** to incorporate advanced safety and monitoring technologies.
  - Encourage collaboration among different government agencies to provide **holistic oversight** of industrial operations.
  - Introduce more stringent evaluation criteria to improve the quality and effectiveness of inspections.

7.6. Operational Framework

Industries play a crucial role in preventing industrial accidents by ensuring the safety of their workforce, surrounding communities, and the environment. Alongside legal and regulatory systems, industries must adopt a robust operational framework that integrates safety measures into their everyday practices. The senior management, tasked with spearheading operations, should act as the internal authority that ensures compliance with safety protocols and fosters a culture of accountability.

Industrial safety requires a dual approach addressing:

1. **On-Site Safety**: Protecting employees and personnel within the facility.
2. **Off-Site Safety**: Safeguarding nearby communities and the surrounding environment.

Unfortunately, off-site safety measures are often weaker, as observed in the **LG Polymers India incident**, leading to catastrophic consequences for both the public and the environment. A comprehensive and proactive approach is essential to bridge these gaps and implement existing policies effectively.

Operational Reforms to Prevent Industrial Accidents

1. **Strengthening Regulatory Oversight**:

- Regulatory authorities such as SPCBs must have sufficient personnel, resources, and autonomy to conduct **frequent and detailed inspections**.
- Enhanced collaboration between industries and regulatory bodies ensures a **coordinated and holistic safety strategy**.

2. **Comprehensive Safety and Health Plans**:
   - Establish an accident prevention and health program covering all levels of personnel, encouraging workers to report unsafe practices without fear of reprisal.
   - Conduct regular safety drills to familiarize employees with emergency protocols.
3. **Pre-Placement Screening**:
   - Ensure that employees are physically capable of performing their assigned tasks through thorough medical evaluations.
   - Align workers' physical capabilities with their job requirements to reduce accidents caused by physical limitations.
4. **Capacity Building for Workers and Managers**:
   - Regularly train employees and management on safety protocols and the use of safety equipment.
   - Incorporate specialized training on body mechanics to prevent strain injuries during manual tasks such as lifting or moving heavy objects.
5. **Identifying Safety Vulnerabilities**:
   - Conduct tailored risk assessments for specific industries to identify common accident triggers.
   - Develop industry-specific strategies to address these vulnerabilities effectively.
6. **Provision of Personal Protective Equipment (PPE)**:
   - Ensure all workers are equipped with high-quality PPE, such as goggles, gloves, helmets, ear protection, and safety shoes.
   - Train employees on the proper usage of protective equipment.
7. **Adequate Staffing Levels**:
   - Prevent worker fatigue by hiring sufficient staff to avoid excessive overtime.
   - Implement shift rotations or hire part-time/seasonal workers to reduce the risk of accidents caused by exhaustion.
8. **Avoiding Shortcuts in Operations**:
   - Enforce strict adherence to operational protocols to prevent workers from bypassing critical safety steps.
   - Clearly communicate job instructions to avoid confusion or negligence.
9. **Routine Maintenance and Inspections**:
   - Regularly inspect all equipment, with special focus on high-risk areas such as chemical storage or machinery zones.
   - Perform preventative maintenance to mitigate risks before they escalate.

10. **Encouraging a Safety Culture**:
- Reinforce safety measures during meetings and supervision.
- Recognize and reward employees who consistently adhere to safety protocols.

11. **Orderly Work Environments**:
- Maintain clean and organized workplaces to prevent accidents caused by clutter.
- Use proper labeling, pathway markings, and spill containment stations to ensure safety.

12. **Failure Mode Effects Analysis (FMEA)**[30]:
- Regularly apply **FMEA** to identify potential failure points in processes or designs.
- Use findings from these analyses to enhance system resilience and minimize risks.

13. **Installing Fail-Safes and Emergency Systems**:
- Implement mechanisms to contain leaks or spills of hazardous substances through drainage or diversion systems.
- Introduce neutralizing agents to render toxic substances inert in case of accidental release.

14. **Advanced Alert Systems**:
- Deploy alert systems across the facility and its surroundings to warn employees and nearby residents in case of emergencies.

15. **Safety Data Sheets (SDS)**:
- Provide SDSs containing critical information about hazardous substances to employees, first responders, and local authorities.

16. **Regular HAZOP Studies**:
- Conduct **Hazard and Operability (HAZOP)** studies periodically to identify potential deviations in processes and design effective mitigation strategies.
- Encourage collaboration between cross-functional teams for more comprehensive hazard identification.

Role of Senior Management

The ultimate responsibility for enforcing safety measures rests with the **senior management**. Their role involves:

- **Ensuring Full Implementation of Safety Protocols**:
  - All safety measures must be operational and adhered to consistently.
  - Hold responsible personnel accountable for lapses in safety compliance.
- **Independent Safety Audits**:
  - Regularly review safety systems and Standard Operating Procedures (SOPs).
  - Update SOPs based on audit findings and new developments in safety standards.
- **Transparency with Regulatory Agencies**:
  - Share safety audit reports with regulators to promote accountability and cooperation.

[30] https://cleartax.in/s/fema-foreign-exchange-management-act

7.7. Current Consent Conditions and Authorization

Industries must comply with various consent and authorization requirements to ensure their operations align with environmental safety standards. These include obtaining environmental clearance (EC), as well as consents and authorizations for handling hazardous chemicals and waste. However, despite these frameworks, gaps in implementation and enforcement often lead to industrial accidents. Strengthening these processes is essential to creating a safer industrial environment.

Process for Obtaining Consent and Authorization

1. **Environmental Clearance (EC)**:
   Industries are first required to secure an EC under which additional permissions, such as Forest Clearance, Wildlife Clearance, or Coastal Regulation Zone (CRZ) Clearance, may be required depending on the location and nature of the industry.
2. **Consent to Establish (CTE) and Consent to Operate (CTO)**:
   After obtaining the EC, industries must apply to the **State Pollution Control Boards (SPCBs)** for:
   - **CTE**: To set up the facility.
   - **CTO**: To commence operations.
3. **Authorization for Hazardous Chemicals and Waste**:
   - Industries dealing with hazardous substances must secure separate authorizations for:
     - **On-Site Storage**: Inspected by the Factory Inspector.
     - **Off-Site Storage**: Monitored by SPCBs.

Issues in Consent Conditions and Authorization

A. Lack of Detailed Standard Operating Procedures (SoPs)

In industries handling hazardous chemicals, consent and authorization orders often lack comprehensive SoPs.

- **Consequences**:
  - Missing details about chemical processes, toxicity levels, safety measures, and emergency response protocols.
  - Ineffective emergency response, as seen in the **LG Polymers gas leak** where gaps in SoPs delayed fault detection and mitigation efforts.
- **Recommendations**:
  - Include detailed SoPs in all consent and authorization orders to strengthen compliance and reduce risks.

B. Inadequate Inspections and Reports

Inspections of hazardous industries are often superficial, focusing on appearances rather than thorough evaluations based on inspection checklists.

- **Issues Identified**:
  - Factory inspectors and SPCBs fail to conduct proper inspections, perpetuating negligence.
  - Inspection reports are rarely made public, reducing accountability.
- **Recommendations**:
  - Improve the technical capacity of inspectors.
  - Ensure transparency by publishing inspection reports and show-cause notices in the public domain[31].

C. Weak Site Appraisal Committees

After the **Bhopal Gas Tragedy**, amendments to the Factories Act mandated state governments to form **13-member Site Appraisal Committees** to oversee compliance with safety norms.

- **Current Challenges**:
  - Many states have not established these committees.
  - SPCB officers are often unaware of this requirement.
- **Recommendations**:
  - Urgently establish Site Appraisal Committees to inspect new and existing industries.
  - Develop phased plans to relocate hazardous industries away from human settlements.

D. Absence of Special Courts for Industrial Accidents

The **Make in India** initiative has accelerated industrial growth, increasing the likelihood of accidents. However, many victims remain uncompensated, and liability is often unclear.

- **Challenges**:
  - Existing courts struggle with delays in addressing industrial accident cases.
- **Recommendations**:
  - Establish **fast-track courts** to handle claims arising from industrial accidents promptly.
  - Expedite pending cases to ensure justice for affected individuals[32].

E. Lack of Buffer Zones

Industries handling hazardous chemicals often operate close to residential areas, increasing the risk of mass casualties during accidents.

- **Recommendations**:
  - Mandate **buffer zones** around hazardous industries where no residential or commercial activities are permitted.
  - Strictly enforce these provisions during the planning and approval stages.

[31] https://economictimes.indiatimes.com/news/politics-and-nation/lg-polymers-india-has-absolute-liability-for-gas-leak-says-ngt/articleshow/76172925.cms

[32] https://www.casemine.com/judgement/uk/5a938b3d60d03e5f6b82b9ef

F. Poor Stakeholder Awareness

Disaster management plans (DMPs) often exist only on paper and are not communicated effectively to local stakeholders.

- **Challenges**:
  - Residents are unaware of actions to take during emergencies, as seen in the **Bhopal Gas Tragedy** and **Vizag Gas Leak**.
- **Recommendations**:
  - Conduct awareness campaigns for local communities, hospitals, and emergency services about disaster response measures.
  - Organize mock drills regularly to test and improve preparedness.

G. Implementation of Emergency Plans

Rules such as the **Manufacture, Storage, and Import of Hazardous Chemicals Rules, 1989**, and the **Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996**, mandate on-site and off-site emergency plans.

- **Challenges**:
  - Few mock drills are conducted at the district level.
  - Emergency plans are rarely shared with stakeholders.
- **Recommendations**:
  - Enforce mandatory mock drills to ensure readiness.
  - Share emergency plans with all stakeholders to minimize casualties during accidents.

H. Limited Powers of SPCBs

SPCBs lack the authority to impose fines directly, limiting their effectiveness in enforcing compliance.

- **Recommendations**:
  - Grant SPCBs both **civil and criminal powers** to prosecute non-compliant industries.

I. Authorizations Granted Without Thorough Assessments

Industries often receive authorizations based on the information provided in their applications, without adequate verification.

- **Recommendations**:
  - Conduct detailed assessments of production processes, raw material requirements, and waste management plans before granting authorizations.[33]

CHAPTER 8

CONCLUSION AND DISCUSSION

[33] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2359084

8.1. Defenses in the Context of Absolute Liability

The principle of **absolute liability** is fundamentally different from **strict liability** due to its **no-defenses approach**. In strict liability cases, the defendant may invoke defenses such as:

- **Act of God**: Unforeseen natural events beyond human control.
- **Act of a Third Party**: Events caused by someone other than the defendant.

However, under absolute liability, **no such defenses are permissible**. This principle ensures that enterprises involved in inherently dangerous activities are held fully accountable for any harm caused, regardless of external factors.

This strict standard of liability addresses the loopholes present in the traditional strict liability doctrine, making it more effective in ensuring justice for victims and deterring negligence by industries.

8.2. Suggestions and Conclusion

1. **The Principle of Corrective Justice**

The legal system is built on the foundation of **corrective justice**, which aims to rectify wrongs by compensating victims for the harm they have suffered. This requires liability principles to evolve and adapt to the **changing dynamics of society** and technological advancements.

Outdated Nature of Strict Liability:

- Strict liability, though revolutionary in its time, was formulated over two centuries ago during an era of limited industrial and technological development.
- The **exceptions** in strict liability, while relevant then, have become exploitable loopholes today.

Need for Absolute Liability:

- The doctrine of absolute liability eliminates these exceptions, making it more suitable for modern times.
- It addresses the complexities of contemporary industries and ensures that victims receive fair compensation without being subjected to lengthy legal battles over defenses.

2. Evolution of Absolute Liability

Absolute liability deviates from traditional notions of justice, such as the principle that a person is only liable if proven guilty. This shift is necessary because:

- Large corporations often exploit defenses to evade responsibility, undermining the victims' rights.
- Absolute liability ensures accountability by **removing all defenses** and mandating compensation for harm caused by hazardous activities, irrespective of intent or negligence.

The **M.C. Mehta v. Union of India** case introduced this principle in India, highlighting the judiciary's progressive role in adapting laws to contemporary challenges. The decision reflects the Indian judiciary's commitment to aligning legal principles with evolving societal needs.

3. Addressing Loopholes in Absolute Liability

While absolute liability is a significant improvement, there are still areas for refinement:

- **Disparity in Compensation**:
  - Large corporations can afford substantial compensation, but smaller industries may not have the financial capacity to provide adequate relief to victims.
  - This disparity violates the core principle of justice, as victims may receive compensation that is **disproportionate to their losses**.

Proposed Solution:

- Amend the principle to ensure that compensation correlates with the **actual losses sustained by victims**, irrespective of the enterprise's financial capacity.
- For smaller industries, establish a **mandatory insurance framework** to guarantee victim compensation without jeopardizing the industry's survival.

4. The Role of Judiciary in Modernizing Liability Principles

The Indian judiciary has played a pivotal role in evolving liability principles to meet the demands of modern times.

- The **Bhopal Gas Tragedy** and the **Oleum Gas Leak Case** demonstrate the judiciary's shift from strict liability to absolute liability.
- These cases underline the inadequacy of strict liability in addressing mass industrial disasters.

Absolute liability has not only improved justice for victims but also established a stronger deterrent against negligence. The doctrine's evolution reflects the judiciary's **proactive and forward-thinking approach**, ensuring that the legal system remains relevant and effective.

5. The Importance of a Balanced Approach

While absolute liability enhances victim protection, it must be applied judiciously to avoid unintended consequences:

- Smaller industries, which lack the financial resources of large corporations, may face existential challenges under absolute liability.
- A **balanced approach** is essential to protect victims' rights while ensuring that industries are not disproportionately burdened.

Recommendations:

- **Tiered Liability Framework**: Different levels of liability for small, medium, and large enterprises.
- **Mandatory Risk Insurance**: Ensure that all industries are prepared to compensate victims without financial strain.

6. The Way Forward

The evolution of liability principles should not stagnate. As industries and technologies continue to advance, the legal system must remain adaptable. This includes:

- Regular **judicial review** of liability doctrines to address emerging challenges.

- Continued emphasis on ensuring fairness and justice in all liability cases.

The principle of absolute liability, as applied in **M.C. Mehta v. Union of India**, serves as a benchmark for progressive legal reforms. It ensures that victims are not left without remedies and that industries prioritize safety over profit.

Case Table

S. No.	Case Name	Year	Key Principle/Outcome	Relevance
1	**M.C. Mehta v. Union of India (Oleum Gas Leak Case)**	1987	Introduced the **Absolute Liability** principle.	Established that hazardous industries must compensate victims without exceptions.
2	**Union Carbide Corporation v. Union of India (Bhopal Gas Tragedy)**	1984	Highlighted the need for stronger industrial safety laws.	Led to stricter regulations under the **Environment (Protection) Act, 1986** and related rules.
3	**Vizag Gas Leak (LG Polymers India Pvt. Ltd.)**	2020	Applied the "Polluter Pays" and **Absolute Liability** principles.	Demonstrated lapses in regulatory oversight and highlighted the importance of on-site and off-site emergency plans.
4	**GAIL Pipeline Blast**	2014	Exposed issues of negligence in gas pipeline maintenance.	Brought attention to systemic lapses in monitoring and maintenance of hazardous pipelines.
5	**Bhilai Steel Plant Gas Leak**	2014	Resulted in the deaths of 6 workers due to negligence in pipeline maintenance.	Highlighted inadequate inspection protocols and operational safety measures.
6	**Bhilai Steel Plant**	2018	Resulted in the deaths of 9	Demonstrated the risks of

	Blast		workers during a gas pipeline maintenance operation.	improper maintenance and non-adherence to safety protocols.
7	**Delhi Gas Leak**	2017	Affected over 470 schoolchildren due to a chemical leak near a school.	Brought focus to risks associated with industrial activities near residential areas.
8	**Chemisynth Chemical Factory Explosion**	2019	Killed 13 workers due to a chemical barrel explosion.	Highlighted the need for stricter enforcement of hazardous material handling protocols.
9	**ONGC Plant Fire**	2019	Resulted in fatalities due to negligence in fire safety measures.	Demonstrated gaps in fire safety protocols at oil and gas facilities.
10	**Rylands v. Fletcher** (UK Case)	1868	Established the **Strict Liability** principle.	Basis for evolving into the Absolute Liability principle in India.

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