



Online Ethics Center
FOR ENGINEERING AND SCIENCE

Bhopal Disaster Bibliography

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Description

A bibliography including links to case studies, books, reports and journal articles looking at the engineering ethics and policy issues looking at the Bhopal gas tragedy, where a gas leak from a Union Carbide plant caused one of the world's worst industrial disasters.

Body

Case Studies and Teaching Materials

Murphy-Medley, Deena. (2001) [Exportation of Risk: The Case of Bhopal](#). Online Ethics Center for Engineering. National Academy of Engineering.

A case study analysing the Bhopal disaster from the standpoint of exporting risk from industrial to developing countries. The case considers the moral responsibility for preventing such tragedies on the part of multinational corporations, the governments of the industrialized nations where they are head quartered, and the governments of developing countries where they operate. The moral responsibilities of engineers and scientists working for these organizations are also considered.

Peterson, M.J. (2009). [Bhopal Plant Disaster](#). International Dimensions of Ethics Education in Science and Engineering.

Developed by the Science, Technology and Society Initiative at the University of Massachusetts, Amherst, this case study provides a summary of the case, a chronology of events, a list of stakeholders, and overviews of the economic and industrial climate of India at the time of the disaster as well as details about the Union Carbide Corporation. The site also includes presentation slides that can be used by instructors.

Overview and Continuing Coverage

Bagla, Pallava. (2010) India Launches New Probe of Cyanide Disaster. *Science*.329(5987): 19. doi: 10.1126/science.329.5987.19.

Twenty-five years after the world's worst chemical disaster, the Indian government ordered the remediation of the contaminated site in Bhopal and the creation of a research institute to study the health impacts of the disaster on the survivors. The decision is controversial because years of research has only uncovered acute effects of the gas.

[BBC News. \(2004\). One Night in Bhopal.](#)

This documentary focuses on five local people who saw first-hand the effects of the gas on patients, a local police superintendent who helped to restore calm on that night, and a young technician at the factory whose life was saved by a gas mask. Available online, the web site also includes a large collection of articles covering the commemoration of the disaster and lingering effects on the community and the industry.

D'Silva, T. *The Black Box of Bhopal: A Closer Look at the World's Deadliest Industrial Disaster*. Victoria: Trafford Publishing, 2006. 263p.

A factual account of the disaster written by a chemical engineer that provides an excellent analysis of its causes and consequences. Includes reprints of key primary documents in the book's appendices.

Kurtzman, D. (1987) *A Killing Wind: Inside Union Carbide and the Bhopal Catastrophe*. New York: McGraw Hill.

This is a less technical account of the Bhopal disaster which focuses on the stories of several people involved, including leaders in Union Carbide, civil leaders of Bhopal,

and people working at and living near the factory.

Lewis, S. (2007) [The Bhopal Chemical Disaster: Twenty Years Without Justice](#), Amherst, Mass: Strategic Video Productions.

A video produced by Samford Lewis, detailing the disaster and its aftermath.

Polgreen, Lydia and Hari Kumar. (2010). [8 Former Executives Guilty in '84 Bhopal Chemical Leak](#). *New York Times* (June 7) Online Edition.

Twenty-five years after the Bhopal disaster, eight former executives of Union Carbide's Indian subsidiary – including one who has since died were convicted of negligence.

Rai, S. 2004. [Bhopal Victims Not Fully Paid, Rights Group Says](#). *New York Times* (November 30) (online edition).

Discusses the ongoing suffering of victims of the Bhopal disaster, and Union Carbide's claim that their legal responsibility was met with their settlement with the Indian government in 1989. According to Amnesty International, however, neither Union Carbide or Dow Chemical (who took over Union Carbide) have taken responsibility to clean up the site or stop subsequent pollution from the plant which was abandoned in December 1984.

Sengupta, S. 2008. [Decades Later, Toxic Sludge Torments Bhopal](#). *New York Times* (July 7) (online edition).

Article detailing the continuing health and environmental impact of the disaster, as tons of waste still sits in a warehouse of the Union Carbide pesticide factory in Bhopal, infecting the soil and the water of the community still living in the area.

Shrivastava, P. 1987. *Bhopal: Anatomy of a crisis*. Cambridge, MA: Ballinger.

This book gives an account of the Bhopal disaster based on over 200 interviews and discusses the lessons to be learned from the lingering nature of this crisis. The author discusses how industrial crises have identifiable causes – human, organizational, and technical – and the need for new business and social policies designed to prevent similar crises in the future.

Union Carbide Corporation. [Bhopal Gas Tragedy Information](#).

A description of the industrial disaster by Union Carbide Corporation, the company responsible for the disaster, as well as a history of their response to the disaster.

Includes links to the Jackson Browning Report, the court document detailing the scientific and legal investigations into the cause of the gas release as well as a link to Union Carbide's Responsible Care program, which is meant to help prevent such an event in the future by improving safety standards, community awareness, and emergency preparedness.

Engineering Ethics

Bowonder, B. (1987). The Bhopal Accident. *Technological Forecasting and Social Change* 32:169-182. doi: [10.1016/0040-1625\(87\)90038-2](https://doi.org/10.1016/0040-1625(87)90038-2).

This article details the events preceding and following the accidental release of methylisocyanate at Union Carbide's Bhopal plant and examines three types of errors that occurred: human, technological, and system.

Bowonder, B. and H. Linstone. 1987. Notes on the Bhopal Accident: Risk Analysis and Multiple Perspectives. *Technological Forecasting and Social Change* 32: 183-202. doi: [10.1016/0040-1625\(87\)90039-4](https://doi.org/10.1016/0040-1625(87)90039-4).

This article, which references the article above by Bowonder, looks at the Bhopal chemical disaster from multiple viewpoints as a way to analyse the risks that existed before the event. The authors look at the organizational and personal perspectives to show their role in illuminating the case and evoking insights.

Chouhan, T. R. (2005) The Unfolding of Bhopal Disaster. *Journal of Loss Prevention in the Process Industries*. 18(4-6) 205-208.

Written by an employee of Union Carbide India at the Bhopal plant, the author explores the merciless cost-cutting severely affecting materials of construction, maintenance, training, manpower and morale that resulted in the disaster.

Significant differences between the West Virginia, USA plant and the Bhopal, India plant show the callous disregard of the corporation for the people of the developing countries.

CFTU-ICEF (1985) *The Report of the ICFTU-ICEF Mission to study the causes and Effects of the Methyl Isocyanate Gas Leak at the Union Carbide Pesticide Plant in Bhopal, India, on December 2nd/3rd 1984*. International Confederation of Free Trade Unions/International Federation of Chemical, Energy, and General Workers Unions.

A report based on an onsite study done by a twelve member fact-finding committee

that found that while some wrong decisions were made by local plant managers, a large share of responsibility belongs to Union Carbide Corp. The report also found that many of the factors that caused or contributed to the disaster are common to many chemical manufacturers and industrial processes around the world, and are problems that can be controlled with proper safety procedures in place.

Jasanoff, S. (ED.). (1994) Learning From Disaster: Risk Management After Bhopal. Philadelphia: University of Pennsylvania Press.

This is a collection of twelve papers that not only discuss the Bhopal disaster as a case study, but also seeks to address wider questions about the transfer and control of hazardous technologies and the capacity of human societies to learn from failure.

Lepkowski, W. (1994). Ten years later: Bhopal. *Chemical & Engineering News* (December 19): 8-18.

Details the events of the disaster, the confusing and often contradictory accounts of the facts of the event, and the ongoing suffering of the victims exposed to the gas. The article also discussed the “post-Bhopal” era of evolving openness and accountability in safety matters in the chemical industry, and how there is much further to go in this regard.

Paustenbach, D. J. (1987). Bhopal, Asbestos, and Love Canal . . . How They Should Affect Engineering Education. *Technology and Society Magazine, IEEE*, 6(1), 9-15. doi: 10.1109/MTAS.1987.5010071.

Over the past 15 years, society has come to expect that engineers, as practitioners and managers, be aware of those activities over which they have control, that could adversely affect the public's well-being. Specifically, due to incidents such as Love Canal, Bhopal, and Chernobyl, the public now recognizes that technology which is within the control of others can, if mishandled, jeopardize the health and well-being of thousands of innocent people. This paper suggests that schools of engineering have a responsibility to prepare engineers to meet these expectations and it recommends an approach to meet this challenge.

Reisch, M. 2004. [Twenty Years After Bhopal](#). *Chemical and Engineering News* 82 (no.23, June 7): 19-23.

The author discusses the reactions of U.S. chemical industry leaders to the Bhopal disaster in developing the Responsible Care program, and the critics who say they have not done enough.

Stix, G. (1989). Bhopal: a tragedy in waiting. *Spectrum, IEEE, 26(6), 47-50.* doi: 10.1109/6.29340.

The lessons implicit in the industrial accident in Bhopal, India in 1984 are discussed. Union Carbide's approach to risk planning and management are examined in the context of the disaster. The factors that set the stage for the accident are also identified.

Varma, R., & Varma, D. R. (2005). The Bhopal Disaster of 1984. *Bulletin of Science, Technology & Society, 25(1), 37-45.* doi: 10.1177/0270467604273822.

The world's worst industrial disaster in Bhopal, India, happened because of inadequate maintenance by Union Carbide and poor monitoring by the Indian authorities. Malfunctioning safety measures, inappropriate location of the plant, and lack of information about the identity and toxicity of the gas worsened the effects of the accident on people and livestock. In this article, the authors present what happened and why and what lessons can be learned at this terrible cost.

Weiss, B., & Clarkson, T. W. (1986). Toxic Chemical Disasters and the Implications of Bhopal for Technology Transfer. *The Milbank Quarterly, 64 (2), 216-240.* doi: 10.2307/3349971.

The author discusses how the disaster at Bhopal is a dramatic reminder of how the transfer of chemical technology must be accompanied by transfer of the corresponding infratechnology, toxicology. Only then can the process of technology transfer be managed with fewer risks, fewer costs, and fewer tragic surprises.

Wilson, G. T. (1986). Lessons of Bhopal for Production Managers. *Engineering Management Review, IEEE, 14(3), 33-43.* doi: 10.1109/EMR.1986.4306222.

This article looks at the industrial disasters of Bhopal and Mexico City in late 1984, from a production manager's point of view. What errors in production management and safety were made? What can be done to lessen the likelihood of such disasters? What "lessons" should be learned, or reiterated?

Policy Issues

Amnesty International. (2004). [Clouds of Injustice: Bhopal Disaster 20 years on.](#)

Written on the 20th anniversary of the disaster, this report gives a detailed account of the human rights impact of the leak and the contamination, corporate accountability for the leak, and the responsibility of the Indian state to hold the Union Carbide Corporation accountable and to ensure victims receive compensation and rehabilitation. The report aims to expose the failure of Union Carbide Corporation/Dow and the Indian government to comply with their respective obligations to prevent the gas leak and address its consequences, as well as to adequately address their human rights responsibilities.

Broughton, Edward. (2005) The Bhopal Disaster and its Aftermath: A review. *Environmental Health*. 4(6): doi: 10.1186/1476-069X-4-6.

This article gives an excellent summary of the worst industrial accident in history, Union Carbide's attempt to avoid legal responsibility and their final settlement with the Indian government. The authors stress the need for enforceable international standards for environmental safety, preventative strategies to avoid similar accidents, and industrial disaster preparedness.

Chiles, J. R. (2002). *Inviting Disaster: Lessons from the Edge of Technology*. Harper Business: New York.

Covering a number of disasters including Bhopal, the author looks at how even the most "smart" technological systems are prone to failure and how these catastrophes occur, their outcomes, and potential ways of avoiding these failures in the future.

Dhillon, K. (2002). Bhopal's Deadliest Night--A Case Study. *Australian Journal of Professional and Applied Ethics*, 4(1), 1-29.

After exploring the catastrophic effects of the Bhopal disaster, the author discusses how the adoption of a precautionary approach to industrialization in developing communities could have prevented or at least minimized the fatalities, arising from the breakdown of the Carbide facility,. Globalization needs to be viewed in totality as a complex and multidimensional concept and not a monolithic process. Any hasty judgments about globalization 'per se', therefore, can be grossly irrelevant. It is a system of interacting forces--economic, political, cultural, et al.--intersecting with the unique features of the local milieu. In some cases, of which Bhopal is a spectacularly tragic example, the consequences of such interactions can be catastrophic.

Fortun, K. (1998). THE BHOPAL DISASTER: Advocacy and Expertise. *Science as Culture*, 7(2), 193.

This article discusses the Bhopal Group for Information and Action (BGIA), a group of

Indian activists working to support victims of the Bhopal disaster in India.

Jasanoff, S. (2007). Bhopal's Trials of Knowledge and Ignorance. *ISIS: Journal of the History of Science in Society*, 98(2), 344-350.

The disastrous gas leak at a Union Carbide plant in Bhopal, India, in December 1984 displayed the law's tragic inability to cope with the consequences of technological globalization. This essay describes the protracted efforts of the gas victims to obtain relief from courts in India and the United States and the reasons why the settlement of their legal claims did not satisfy their demands for justice.

Jayaraman, N. (2009). Wrong Questions. Wrong Answers. *Global Social Policy*, 9(3), 318-321.

The article discusses the lessons which could have been learned after the Union Carbide Corp. factory disaster in Bhopal, India. It mentions that the aftermath of the disaster teaches about basic respect for life, the importance of life over profits and preparation for any disaster to happen in the future.

Morehouse, Ward and M. Arun Subramaniam. (1986) The Bhopal Tragedy: What Really Happened and What it Means for American Workers and Communities at Risk. Preliminary Report for the Citizens Commission on Bhopal. New York: Council on International and Public Affairs.

A report for the Citizens Commission on Bhopal, this was the first book-length account of the Bhopal tragedy and its implications for American workers and communities exposed to similar risks. It addresses the key question of who was responsible for this catastrophic accident and probes the health and environmental, impact of the disaster.

Ravi Rajan, S. (2002). Disaster, Development and Governance: Reflections on the 'Lessons' of Bhopal. *Environmental Values*, 11(3), 369-394.

The paper firstly uses the case study of the Bhopal gas disaster to understand why many scholars and activists seek alternatives to 'big' development. Secondly, it critically examines the claims that have been made in this regard in the literature in political ecology, science and technology studies and environmental governance, and in doing so, articulates a framework of questions for the next generation of research and advocacy.

Shrivastava, P. (1996). Long-term recovery from the Bhopal Crisis. In J. Mitchell, Ed., *The long road to recovery: Community responses to industrial*

disaster. United Nations University Press.

This chapter begins with a brief description of the Bhopal crisis and then discusses causes of the crisis in terms of antecedent conditions and accident-related failures. The author then describes a multiple perspectives framework for understanding crisis recovery issues that looks at the perspectives of the primary stake-holders - the community and its victims, Union Carbide Corporation, and the Government of India. The final section includes speculations about long-term recovery from crisis and examines policy implications.

Trotter, R. C., Day, S. G., & Love, A. E. (1989). Bhopal, India, and Union Carbide: the second tragedy. *Journal of Business Ethics*, 8(6), 439-454.

This article examines the legal, ethical, and public policy issues involved in the Bhopal disaster that caused the death of over 3,000 people and injured thousands more. The paper begins with the results surrounding the accident, and then discusses an international situation audit examining internal strengths and weakness, and external opportunities and threats faced by Union Carbide. The author also discusses the second tragedy of Bhopal, the tragic failure of the international legal system to adequately and timely compensate the victims of the accident.

Waldman, Amy. (2002) [Bhopal Seethes, Pained and Poor 18 Years Later.](#) *New York Times*, September 21, 2002.

This newspaper article discusses how eighteen years after the accident, the CEO of Union Carbide has still not been brought up on charges and victims have received little or no compensation for the injuries suffered from the disaster.

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