# Industrial Disasters and the Culture of Secrecy: A Case Study of Chernobyl

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## Abstract

The Chernobyl nuclear disaster of 1986 is a case study of organizational secrecy, rigid political ideology, and technological malfunctions that led to the most disastrous industrial accident. The analysis principally relies on the detailed account of Adam Higginbotham's *Midnight in Chernobyl*, cross-examining technical and policy factors that resulted in such a catastrophe through the lens of three overlapping themes: (1) technical and human factors contributing to the accident, (2) the culture of secrecy and its outcomes as practiced by the Soviet Union and its impacts on disaster response and public health communication, and (3) lessons for the modern industrial safety governance and ethical transparency. The paper presents the human and environmental consequences of the disaster caused by institutional secrecy and authoritarian rigidity that delayed effective response and undermined public trust. It also provides policy recommendations to mitigate the likelihood of such catastrophe in future on the basis of transparency, independent oversight, and enhanced safety culture.

## Keywords

Culture of Secrecy, Industrial Disasters, Safety Culture, Institutional Transparency, Nuclear Ethics

### 1.    Introduction

The industrial accidents that have occurred in the past like mining accidents, chemical plant explosions, and nuclear meltdowns are not at all isolated technical failures; rather are cumulative results of design flaws, organizational culture, political rigidity, and regulatory inefficiencies (World Nuclear Association, n.d.). Chernobyl disaster is a paradigm of poorly designed reactor along with unsafe operating procedures and rigid political-ideological regime (Higginbotham, 2019). This paper employs *Midnight in Chernobyl* as its central narrative and interpretative tool in discussing the role of secrecy and institutional incompetence as catalysts for such disaster, thereby presenting lessons from Chernobyl incident, which are applicable in the current industrial governance.

### 2.    Literature Review

Scholars have highlighted three aspects regarding Chernobyl incident and its consequences, namely: (a) technical and design shortcomings in the RBMK reactor series, (b) operational limitations and poor safety standards, and (c) secrecy of Soviet governance on prompt action and open reporting ((Kortov & Ustyantsev, 2012; OECD-NEA, 2002). Higginbotham presents a comprehensive account on the basis of archival records, interviews, and classified data in order to show how authoritarian secrecy influenced pre-accident decision-making and aftermath communications regarding the severity and consequences of the accident (Higginbotham, 2019). The International evaluation reports by the International Atomic Energy Agency (IAEA) and further scientific assessments have accused this amalgamation of technological and organizational factors as main culprit for long-term effects on population and environment (IAEA, 2005; Rahu, 2003). Collectively, scholarly studies have showcased Chernobyl incident as a socio-technical calamity, where the secrecy-culture had a conclusive role.

### 3.    The RBMK Reactor and Immediate Technical Causes

The explosion in Unit 4 was in a RBMK (Reaktor Bolshoy Moshchnosti Kanalny) model Soviet-designed reactor, which was water-cooled, and graphite-moderated. Although this specific model used to provide some of the production and

refueling conveniences, RBMK model possessed some design flaws that made it an unstable reactor at low power with positive void coefficient, a condition whereby the formation of steam could lead to an acute level of reactivity (World Nuclear Association, n.d.; Kortov & Ustyantsev, 2012). On the evening of April 25 26, 1986 the operators were carrying out a safety test regarding whether the turbines in the station could supply emergency systems in case of complete black-out. As a result of a set of procedural deviations, hasty schedule and improper communication, the reactor was placed in a low-power condition leading to Xenon poisoning in the core. Then subsequent power surge caused a dynamic steam-explosion, followed by super-heated graphite-explosion, which demolished the unit-4 power plant and spread significant amounts of radioactive debris outside. Thus, technical flaws accompanied by human and organizational factors triggered the catastrophic incident.

### 4. Organizational and Human Factors

One of the proximate causes was human error, that took place in the form of organizational inefficiencies. Higginbotham points out how plant practices circumvented security norms; operators were instructed to disable important safety features, making dangerous moves to reach production goals instead of obeying standardized instructions (Higginbotham, 2019). Lack of training, insufficient channels of communication with designers and nuclear experts and existence of a management culture that valued speed and production above safety played vital roles. Institutional checks were counterfeit; impartial regulatory body was absent, and voices of whistle blowers were suppressed. In this way, by the time that the test started after stipulated time period, there was a lack of organizational strength to identify and sojourn the devil.

### 5. The Culture of Secrecy: Mechanisms and Motives

Cold War necessities, centralized planning, and an information regime that favored secrecy and political demands over safety concerns used to mediate such technologically sensitive projects. This secrecy was used in various ways; technical documents were classified under state policy, reports about incidents were suppressed, the decision-making process of parties and security agencies was centralized, and the media was strictly controlled by the state agency. The narrative reconstruction by Higginbotham shows that due to this lack of transparency, the design failures that engineers were aware of did not disseminate readily to operators or external audits, and early indicators of a flawed reactor were viewed through the prism of an organizational culture that does not favor open disclosure (Higginbotham, 2019). Reasons behind this were numerous like the desire of not to cause panic in society, the quintessential need to save Soviet reputation of scientific and technological domination and the need to avoid political disgrace. However, they resulted in a lack of situational awareness and denial towards external help, eventually leading to such a disaster.

### 6. Secrecy and the Early Response

The deadly impact of secrecy on emergency response was seen just after the explosion. There was an early official attempt to undermine the severity of the accident. Plant authorities were totally reluctant to evacuate the city of Pripyat, since it would imply a systemic failure and political upset (Higginbotham, 2019). Firefighters and emergency crews, who were not provided with the proper information about the radioactive threat were exposed to invisible enemy and were not adequately equipped with protection equipment to fight against fatal doses of radiations. Furthermore, it took a long time for the international agencies and neighboring countries to know about the incident, before they received information about the cross-border radioactive fallouts from Swedish radiation reports, forcing Soviet Union into an unwilling disclosure (New Yorker; World Nuclear Association). This gap between the event and transparent communication augmented the exposure crisis, eroding the institutional trust.

### 7. Health, Environment, and Politics of Information

Secrecy also hindered immediate rescue efforts, scientific surveillance and interventions in public health. To be able to perform reliable epidemiological assessment, timely transparent data would be needed on exposure, patterns of contamination and health outcomes. Initial Soviet secrecy and cherry picking established a condition, where rumor and mistrust thrived and independent researchers faced a setback in getting correct information (Rahu, 2003; IAEA, 2005). However, through international investigations, increase in thyroid cancer among children and other physical as well as psychological consequences were eventually documented, but mortality and morbidity count still differed from official

account (IAEA, 2005; OECD-NEA, 2002). Information Politics had thus influenced the public discourse and industrial policy regarding disasters.

### 8.      Secrecy, Propaganda, and the Erosion of Trust

The Soviet response to Chernobyl disaster through the denial of severity, control of institutional communications, and deliberate minimization of long-term consequences undermined public trust (EHNE Encyclopedia, 2022; Higginbotham, 2019). The catastrophe brought the conflicting issues regarding Soviet scientific incompetence and inefficient decision-making in both institutional and governance level. In a larger context, scholars have attributed Chernobyl incident as the root cause for the dissolution of the Soviet Union (EHNE Encyclopedia, 2022). The refusal to disclose the truth and falsification of information during crisis may help authorities in gaining temporary political immunity; but they suffer a huge loss of credibility in the long run (which is key for successful government and public cooperation during crisis).

### 9.      Comparative Perspectives: Secrecy in Industrial Accidents

The Chernobyl disaster shows the devastating effects of technological risk, when it is integrated into opaque political structures. But, Chernobyl is not the only one with peculiar causes of both technical failure and institutional secrecy. Similar processes can be traced in other significant industrial incidents in various political and economic environments, which lead to the assumption that secrecy is not a characteristic feature of authoritarian systems only, rather can also be embedded in corporations, government regulation, and mixed governance frameworks.

The 1984 Bhopal Gas Tragedy, which dealt with the toxic gas leak in a pesticide plant of Union Carbide, exemplifies how human plight can be amplified due to the corporate obscurity and lack of regulatory checks and balances. During the early period of the leak, the chemical compositions of the gas (methyl isocyanate and other byproducts), medical consequences, and proper remedial procedures were not clearly disseminated among the local authorities and hospitals. Such latency impeded any efficient medical response leading to long-term health effects of the affected community. Later legal cases and inspections found negligence in the maintenance documentation, safety inspections, and emergency preparedness (most of which were not publicly accessible). In Chernobyl, secrecy was not only the noisy passivity of the absence of information; but also an aggressive effort to deny the truth and move on.

On the same note, the Fukushima Daiichi Nuclear Power Plant incident in 2011 (Japan) revealed tensions between the corporate management and open communication with the people. The plant, which was run by Tokyo Electric power company (TEPCO), experienced core meltdowns after a huge earthquake and a tsunami. Even though Japan has a relatively free and democratic system, early crisis communication has been cited as having flaws, lack of prompt recognition of core meltdowns, and a lack of proper information on radiation releases. Subsequent independent studies came up with regulatory apprehension, lack of risk assessment of the tsunami hazards, and lack of unified communication between government agencies and the plant operators, which eventually led to mass mobilization. Although the situation was very different than that of the Soviet Union, the institutional defensiveness and information management trends replicated the motifs of Chernobyl like focus on organizational image and political order over transparency.

Other than nuclear accidents, the secrecy has been instrumental in the maritime and mining tragedies. Research on large mining disasters including ones, where unpublished safety checks or forged records of compliance have played significant roles in displaying the way economic factors can suppress whistleblowing and critical reporting. The shipping incidents (such as oil spills and sinking of ferries) have also featured delayed announcements and apparent disregard for repair alerts. In all these instances, secrecy is frequently conducted in more covert ways than state censorship through nondisclosure policies, bureaucratic partitioning, and downplaying risk communications.

An interdisciplinary comparison makes it clear that there are a number of recurring mechanisms, according to which secrecy worsens the outcomes of disasters:

   a)      **Suppression of Early Warning Signals**: Organizations lose chances to learn correctly, when incident reports, minor accidents or design flaws have been classified or minimized. The previous accidents in Chernobyl reactor and the RBMK design issues were not discussed openly across the institutional boundaries.

b)       **Obstruction of Independent Oversight**: Good regulation requires open access to the operational data. In Bhopal, Fukushima and Chernobyl, regulatory agencies did not have the freedom to access or publicly disclose essential safety information.

c)       **Delayed Public Communication**: Rapid disclosure lays foundation for timely evacuation and protective measures. In both Chernobyl and Fukushima, delays to recognize severity of the disaster ultimately affected remedial responses.

d)       **Erosion of Trust**: institutional secrecy during crises leads to erosion of public trust, making post-disaster responses and health interventions tougher to be accomplished.

Transparency on the other hand improves resilience. The open systems of reporting promote the learning from the past mistakes and inter-institutional support. Independent peer review enables technical communities to determine the systemic flaws, before they can get out of hand to become disastrous. There are accountability mechanisms like investigative journalism and civil society investigations, which provide great chances to adopt safer operational practices. Institutionalization of such lessons in the nuclear sector have been given paramount importance through international conventions and reporting frameworks, which have been established during post-Chernobyl period for timely reporting and peer review of safety standards.

Secrecy seems to be a structural risk enhancer irrespective of political government. Opacity limits adaptive learning and responsiveness to crises, regardless of it being directed by state ideology, corporate liability issues, or bureaucratic inertia. Disasters in industries are not only technical failures, but also failures in communication and ethical governance. In comparison, cultures that legitimize transparency and safeguard whistleblowers, as well as introduce independent control into regulations, are more likely to reduce the probability of technological failure, and its everlasting consequences.

## 10.       Lessons from *Midnight in Chernobyl*

Adam Higginbotham's book, *Midnight in Chernobyl* is very useful in disaster studies, since it is structured with technical reconstruction, archival study and oral testimonies that help to determine how culture, ideology and governance influenced the course of Chernobyl disaster. Instead of explaining the accident as an engineering incident alone, he contextualizes it in a larger socio-political ecosystem, characterized by strict hierarchy, institutionalized defensiveness, and industrial secrecy.

Most significant lesson from Higginbotham's account is the idea of systemic causation. The positive void coefficient and design flaws of the reactor were certainly hazardous, but only due to failure of institutional capacity to recognize, communicate, and rectify them, the rector became catastrophic. Engineers, inspite of such flaws in design worked in a bureaucratic culture that did not permit open criticism. The operators of the plant were also trained under a chain of command, where obedience and output were stressed over rationality and ethical questioning. In this regard, Chernobyl disaster teaches that accidents are hardly the result of personal incompetence, but are created by systems, which standardize institutional risk and discourage scientific criticism.

The second lesson is about psychological and political price of secrecy. Higginbotham demonstrates that fear of political embarrassment and institutional reflexes (with priority to restrict flow of information) influenced the early responses to the explosion. The delayed evacuation of Pripyat city, the denial of reactor core explosion and lethargic international communication were not just mistakes in administration; but structural results of a rigid governance model based on information containment. The book theorizes secrecy not just as a passive bureaucratic phenomenon, but as an active causative agent of harm. Such an interpretation is close to post-disaster evaluations, wherein the International Atomic Energy Agency and the OECD Nuclear Energy Agency both cited transparency, international reporting, and independent regulatory structures as foundations for nuclear safety reform.

Third, *Midnight in Chernobyl* emphasizes the significance of the safety culture, which received popularity in the nuclear governance discourse after 1986. Safety culture is the set of attitudes, competency and behavioral patterns that an organization has about the safety management. The narrative provided by Higginbotham shows how at Chernobyl, the safety measures were often compromised to meet the production targets and political demands. The operators have been

put in a situation, where achieving quotas and adherence to the hierarchical orders were more important than making prudent choices about the operations. The moral of the story is obvious, even high-tech technologies can be abused, unless there is transparent culture supporting scientific criticism and disclosing potential anomalies.

The other important discovery is the role of individual actor in a closed system of utter secrecy. Higginbottom describes scientists, engineers, firefighters, and administrators, who were courageous and committed, and fought at personal cost. But, individual heroism can not substitute structural reform. Institutional safety designs aided by bravery can reduce the effects of crises. Such changes in disaster management can only be possible by shifting from blame on individuals to systemic responsibility. Another issue is the epistemological impacts of secrecy. Suppression and manipulation of information led to politicization of scientific evaluation as well as the loss of confidence among people. Contrasting accounts of incidental severity, magnitude of effects on health, levels of environmental contamination, and even death rates appeared due to centralized communication system. Later international conventions on early notification of nuclear accidents and peer-reviewed safety system have shown efforts to correct this structural shortcoming. In this way, Chernobyl has turned into a case study for structural reform, not only in the Soviet Union, but also in the whole nuclear community of the world.

Lastly, the work of Higginbotham encourages us to think about industrial modernity in general. The Chernobyl incident was a combined consequence of technological ambitions and geopolitical rivalry. It is not just about nuclear energy; any industry with significant risk of failure is vulnerable to such catastrophe, and especially, when conducted under an opaque governance system. Coupled with technological nuances and institutional opacities, the interaction between the complexity of technology and institutional secrecy may create such vulnerability in future, whether it is in chemical production, oil extraction, or large-scale infrastructural project.

## 11.     Policy Implications and Recommendations

Based on the Chernobyl case, the following policy recommendations can be acknowledged to minimize the chances of re-occurrence of similar industrial catastrophes in the future:

a)     **Institutionalized Transparency and Timely Disclosure**: The legal and regulatory frameworks must have a provision of instant reporting of such incidents to independent authorities and public with well-defined levels of escalation. Transparency minimizes risk, as it allows external support and proactive protective measures.

b)     **Strengthening Independent Oversight**: Regulatory authorities should be shielded against political and business influences and given top-most authority to investigate, take corrective actions and publish their results without government censorship.

c)     **Cultivating a Robust Safety Culture**: Companies using risky technologies must encourage the culture of frontline employees reporting any hazard without any intimidation. The safety indicators must be prioritized over rigid production targets.

d)     **International Cooperation and Peer Review**: In technologies having transboundary risks (e.g., nuclear energy), international peer review is necessary, characterized by a rapid exchange of information. Multilateral institutions must be used to encourage rapid sharing of expertise in times of crisis.

e)     **Open Scientific Access for Long-Term Monitoring**: Openly available data is necessary in the context of public health and environmental surveillance to allow independent epidemiological studies, which can be used to promote evidence-based interventions and dispel misconceptions.

## 12.     Limitations and Areas for Future Research

This study has taken into account *Midnight in Chernobyl* as its focal point and not exhaustively examined all primary Soviet archival sources (some of which are still state classified). Empirical studies in the future may take advantage of new declassified state archives, longitudinal epidemiological data, and oral accounts of liquidators to further narrow down estimates of health consequences and to identify the actual implementation of safety reforms across post-Soviet states. Comparative research on cultures of secrecy across various political regimes would also enhance the insight into the influence of governance systems on shaping industrial risks.

### 13.    Conclusion

The Chernobyl disaster is a great example of how a culture of secrecy can turn technical flaws into a disaster. Although the proximate causes of the explosion of Unit 4 were reactor design and human errors committed by operators, still the effect of information politics adopted by the Soviet regime, i.e., its suppression, centralization, and control, increased the damage manifold (because of the delay in evacuations, inability to seek international cooperation, and hindrances to scientific investigations). *Midnight in Chernobyl* by Higginbotham presents a powerful account of various aspects related to the Chernobyl disaster displaying an epitome of investigative journalism. Modern day industrial governance should not view transparency as an optional add-on; rather a fundamental safety norm, otherwise mankind will remain paying the price for infinity.

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