

Divergent Paths: Image Crisis and Reinforcement in Civil Engineering on Social Media—A Comparative Case Study of Expressway Landslides

Jiayin Liang *

Civil Engineering, Central South University, Changsha, Hunan, 410083, China

* Corresponding Author Email: qq1582680639@outlook.com

Abstract. With the popularity of social media, the public image of the civil engineering industry is facing serious stigmatization and a crisis of trust following accidents. This paper takes the online topic of landslide accidents as the entry point, and selects two typical accidents, the landslide of Meida Expressway in Guangdong and the collapse of Guangkun Expressway in Guangxi, to be compared and explore the differentiation mechanism and reconstruction of the image crisis of the civil engineering industry in the context of social media. The research shows significant differences in public opinion trends for the two accidents: due to casualties, information lag, and human-caused attribution, the accident in Guangdong became an image crisis for the industry, while the Guangxi accident was turned into an image bonus item by zero casualties, efficient emergency response, and timely information release. Based on the perspective of discourse institutionalism, this paper proposes an explanatory model comprising three elements and reveals the industry's response process and the effect of image restoration. The findings highlight the critical role of proactive communication and legitimacy alignment in managing industry reputation during crises on social media.

Keywords: Social Media; Public Opinion; Civil Engineering.

1. Introduction Civil Engineering

1.1. Background and problem identification

According to the data from the Ministry of Transport, China's total expressway mileage reached 184,000 kilometers by the end of 2023, ranking first in the world. However, with rapid expansion, aging infrastructure, and safety risks are increasingly prominent. The collapse on the Meida Expressway, which resulted in 52 deaths and 30 injuries, exposed the severe image crisis that the industry is facing in the event of sudden accidents. In the context of social media, such incidents can easily evolve into industry-wide stigmatizing public opinion, and the industry generally faces problems such as delayed responses and a disconnect in narrative. This study aims to explore the mechanism of public opinion differentiation and the path of image reconstruction, which has significant commercial and social value in maintaining industry credibility and reducing reputational damage.

1.2. Research framework

Major accidents, like landslides, can rapidly escalate into industry-wide image crises on social media. However, why did the collapse on the MeiDa Expressway trigger nationwide public opinion of accountability, while the collapse on the Guangkun Expressway became a plus for the industry's image? How did the industry's response process shape such a different public opinion trend after the accident? How should the civil engineering industry build an image-restoration and communication mechanism that adapts to the logic of social media? In response to these questions, this paper aims to systematically reveal the causes and differentiation mechanism of the image crisis in the civil engineering industry in the context of social media by comparing two typical cases.

The study draws on discourse institutionalism and the “opinion-policy” connection theory to construct an analytical framework. Specifically, the study starts with the objective consequence of the accident (the number of casualties) and the attribution of responsibility, focusing on how industry emergency response efficiency and information release strategies act as core mediating variables that affect the scale of public opinion and the type of attribution, and then determine the final image restoration effect. In terms of methodology, this paper adopts a qualitative comparative study design and uses the case-comparison method and text analysis of Weibo data to compare the evolution of public opinion in two incidents systematically.

2. Literature review

This study reviews existing literature along three interrelated streams: (a) industry-specific public opinion management in civil engineering, (b) general mechanisms of public opinion diffusion on social media, and (c) theories of crisis communication and organizational image restoration. Building on these foundations, this paper identifies critical gaps and proposes an integrated analytical framework.

2.1. Industry-specific crisis and public opinion management

Due to the high risk and public nature, civil engineering has become a high-risk area for public opinion crises. Existing research mainly focuses on two dimensions: the emergency management system and the characteristics of industry public opinion. The emergency management system for safety incidents in civil engineering construction comprises five major modules: risk monitoring and early warning, emergency support, emergency response, information reporting and media response, and recovery, investigation, and evaluation. Information reporting and media response are key links in emergency management, but there is a widespread phenomenon of underreporting and misreporting of accidents in the construction industry, which leads to a passive stance by the relevant authorities [1]. At the level of industry public opinion characteristics, online public opinion about accidents has features such as high attention, complex evolution, emotional outpouring leading to “group polarization” [2], and the outbreak of online public opinion has new features such as suddenness, wide participation of subjects, diverse channels of dissemination, and emotional expression [3]. The above research provides a basic framework for understanding public opinion responses in the civil engineering industry but mostly focuses on internal processes and macro-level features.

2.2. General mechanisms of public opinion diffusion on social media

The study of public opinion communication reveals the inherent laws governing its formation and evolution. The evolution of public opinion on accidents and disasters can be divided into four stages: the incubation period, the outbreak period, the fluctuation period, and the regression period. Five core influencing factors can be identified: event sensitivity, media influence, Internet sentiment, and government handling [4]. From the perspective of information ecology theory, the law of public opinion evolution on the platform can be observed: the Weibo platform, which centers on technical disputes, forms a strongly centralized communication structure with significant emotional polarization [5]. At the level of government response, government information release ahead of mass dissemination can effectively reduce public opinion risk [6]. Additionally, in the early stages of information dissemination, dual-layer networks exhibit a radiating state, and regions with prominent information flow are more significantly susceptible to risk transmission [7]. Now, social media is not only a tool for rescue coordination but has also evolved into a ‘digital battlefield’ for power struggles between governments and citizen influencers [8].

It is clear that most of the studies mentioned focused on general emergencies, and there is a lack of systematic analysis of the mechanisms of action underlying specific response measures and public opinion trends in civil engineering industry accidents.

2.3. Crisis communication and organizational image restoration theory

Crisis communication theory provides a core tool for understanding an organization's image management in negative events. Image restoration theory suggests that restoring a damaged organizational image is based on public attitude, and summarizes five major strategies: denial, avoidance of responsibility, reduction of hostility, correction of behavior, and expression of apology [9]. The theory of situational crisis communication further classifies crisis types into victim, accident, and preventable based on attribution of responsibility and proposes differentiated communication strategies for each type [10,11]. Subsequent research further confirms that financial burden is the most significant consequence of safety failure, and leaders generally recognize the efficacy of crisis communication plans in mitigating risks [12]. In addition, crisis responsibility attribution can change dynamically with the appearance of new information, and organizations should adapt to this evolution, seeing the "halo effect" of corporate social responsibility, which means that a good perception of social responsibility before a crisis can reduce the perceived "offending" of the crisis, thereby protecting the reputation [13,14]. At the emotional level, the 3E crisis communication framework emphasizes the unity of three dimensions: effectiveness, efficiency, and empathy [15]. These studies provide a theoretical basis for analyzing image restoration strategies in civil engineering industry accidents.

2.4. Research gap and analytical framework

Combining the above-mentioned literature, the existing research has accumulated rich results in three areas of engineering public opinion management, public opinion communication mechanism and crisis communication theory, but there are still some shortcomings: First, there is a lack of research on public opinion differentiation mechanism based on positive and negative contrast cases; Second, there is a lack of systematic analysis that places industry response processes, public opinion types, and image restoration effects within a unified framework. Drawing on the analysis model of "institutional context - legitimacy concept - institutional implementation", this paper constructs an framework that is applicable to the study of image crisis in the civil engineering industry: Starting from the objective consequences of the accident and the attribution of responsibility, then taking the industry's emergency response and information release strategy as the core variables, analyze how they ultimately determine the effect of image restoration by influencing the scale and type of public opinion [16].

3. Methodology and research design

Based on the research questions and literature review, this study adopted a qualitative research paradigm, using case comparison and text analysis to systematically examine the crises, industry responses, public opinion evolution, and image restoration in the two cases.

3.1. Comparative case study design and case selection

Both incidents occurred on expressways, were associated with subgrade instability caused by persistent heavy rainfall, and attracted significant public concern, with high similarities in the nature of the issues and the background of occurrence, providing conditions for controlling for irrelevant variables and focusing on the core mechanism. However, the public opinion outcomes of the two incidents were opposite: the former caused 52 deaths and 30 injuries, triggering a nationwide accountability and an industry image crisis; despite the similar scale of the road collapse, the latter achieved a "zero casualties, zero delays, zero complaints" outcome, and the public opinion was mainly positive. The different results under similar conditions provide an ideal setting for exploring the mechanisms underlying image crises.

3.2. Dimensions of data collection and analysis

The study used Weibo as the data platform and used “Media Expressway Collapse” and “Baize Expressway collapse” as the core keywords to collect data on popular posts and comment sections in one month after the accidents, and supplemented with data on public opinion reactions within seven days after the release of the official investigation report. After data cleaning and screening, representative comments with more likes and replies were selected as analysis samples.

The analysis path focused on comparisons of three core dimensions: first, the scale and intensity of public opinion, reflecting the heat of public opinion on the issue and the type of response pressure faced by the government; Second, the type and framework of public opinion, which is the dominant discourse strategy used in public opinion expression and its attribution logic; Third, the industry and government response process, including the timing, content and manner of information release.

4. Comparative case analysis: pathways to image crisis and reinforcement

This section presents a comparative analysis of the two cases along the three dimensions outlined in the research design: public opinion scale, discourse framing, and industry response. By juxtaposing the heat of public opinion, dominant attribution frameworks, and response strategies, this study elucidates how these factors converged to produce the opposite outcomes of ‘image crisis’ (Guangdong) and ‘image enhancement’ (Guangxi). The analysis culminates in extracting a theoretical model to explain this differentiation.

4.1. Divergent public opinion scales and consequent response pressures

The size of public opinion is a direct indicator of the heat of public opinion on an issue and a structural variable that determines the type of pressure the government and industry respond to. According to Table 1, statistics showed that within a month, there were more than 150,000 discussions on Weibo related to the collapse of the Meida Expressway in Guangdong Province, with comments involving negative keywords such as “accountability”, “shoddy construction”, and “man-made disaster” accounting for as high as 62%. During the same period, there were 18,000 discussions on the Guangkun Expressway collapse in Guangxi, with 58% of positive and neutral comments expressing approval and concern for the emergency response.

Table 1. Comparison of Weibo Public Opinion Data for Two Accidents.

Comparison indicators	Collapse on Meida Expressway in Guangdong	Collapse on Guangkun Expressway in Guangxi
Total number of discussions on Weibo a month after the accident	About 156,000	About 18,000
Negative sentiment comment proportion	62%	22%
Proportion of positive and neutral comments	38%	58%
The main attribution framework	Man-made disaster/ engineering quality	Natural disaster/ emergency response is effective
Government response to stress types	Stress type	Motivational

In the Guangdong case, the massive public discussion created a strong field of public opinion pressure, forcing the authorities to respond, and the response tended to be “pressure type”, which means that with the main goal of meeting the core demands of the public, the policy results were project suspensions and accountability. The lower level of opinion in the Guangxi case provided a relatively relaxed institutional environment for the authorities to take the initiative in communicating and guiding public opinion. In addition, the response was more inclined to be “incentive-oriented”,

meaning it was oriented towards demonstrating emergency effectiveness and strengthening the industry's professional image. The policy outcome was to continue advancing the project and enhancing the image. This finding is in line with the theoretical expectation that the size of public opinion affects the type of government response, thereby verifying the explanatory power of opinion size as a structural variable [16].

4.2. Framing contests: adversarial vs. consultative discourses and attribution

Opinion type and the attribution framework are other key variables that determine the direction of public opinion. Drawing on the distinction between “adversarial democratic discourse” and “consultative scientific discourse”, this study divides the dominant framework in online commentary into two categories: “adversarial attribution discourse” and “consultative rational discourse” [16].

In the case of the Meida Expressway in Guangdong, the dominant discourse in public opinion exhibits a distinct “antagonistic attribution” feature. A large number of comments directly attributed the cause of the accident to engineering quality and regulatory failure, with typical expressions such as “It’s a quality problem!” “What excuse is there?” “Shoddy construction must be held accountable to the end.” Such words quickly sparked public anger and created a negative cognitive framework of the industry as a whole by reducing complex geological, meteorological, and engineering technical problems to a moral narrative of “man-made disaster”. Data analysis shows that among the top comments with the most likes, 76% belong to confrontational attribution discourse, while only 12% attempt to introduce professional analysis or emphasize objective factors in extreme weather. This suggests that in situations of information uncertainty, the public tends to choose attribution frameworks with lower cognitive costs and greater emotional impact, in line with the theoretical explanation of the “emotional heuristic” in risk perception [17].

In contrast, in the case of the Guangkun Expressway in Guangxi, the type of public opinion presented a pattern dominated by “consultative rational discourse”. Among the top-most-liked comments, 52% expressed recognition of the efficiency of the front-line patrol personnel and emergency response, such as “Discovered by maintenance technicians on patrol, timely” and “The quick emergency response ensured travel safety”. Only 28 percent of the comments questioned the project’s quality. The fact of “zero casualties” provides a solid cognitive anchor for rational discourse, allowing the attribution framework of “extreme weather as the main cause” to hold. This discourse pattern effectively dissolves the mobilization basis of confrontational discourse and creates a favorable public opinion environment for maintaining the industry’s image. This phenomenon also supports the theory that good performance before a crisis has a “halo effect”: The industry’s efficient emergency response in the Guangxi case played a role similar to that of social responsibility, reducing the public’s perception of the crisis’s “offensive” nature [13].

4.3. Crisis response dynamics: information vacuum vs. narrative primacy

The response process of the industry and the government is not a one-way act of passively accepting public opinion, but an important variable in actively participating in shaping public opinion.

In the Media Expressway case, the release of information in the early stages of the accident was delayed. In the crucial 24 hours after the accident, the authorities issued only brief information on the disaster, without analyzing the cause or assigning responsibility, creating an information “vacuum period”. During this period, unofficial information and speculation quickly filled public discourse, and the “man-made disaster” theory’s attribution framework was first established and then widely disseminated. Despite the official release of detailed investigation results and measures, the mainstream attribution framework had solidified by then, and subsequent responses were difficult to reverse the negative perception that had formed. This process confirmed the assertion of the dynamic evolution of crisis responsibility attribution and verified the key role of the “primacy effect” in crisis communication, meaning that in an information vacuum, the earliest emerging discourse framework often shapes the subsequent direction of public opinion [12].

The case of the Guangkun expressway in Guangxi demonstrated a completely different response path. Within four hours of the accident, the relevant authorities issued a warning on the situation through their official Weibo account, clearly stating the key information of “cracks found during inspection - immediate road closure - no casualties”, and proactively constructed a narrative framework of “prevention first, prompt response, and safety guarantee”. The timely and transparent release of information effectively prevented the creation of an information vacuum, making the official narrative the benchmark for public opinion. This response embodies the unity of effectiveness, efficiency, and empathy in the 3E crisis communication framework [17].

5. Discussion and implications

5.1. Research findings

The comparative analysis of the Meida and Guangkun expressway collapses reveals a clear differentiation mechanism in the civil engineering industry’s image crises on social media. The findings can be summarized in four points: First, the scale of public opinion exerts structural pressure on government and industry responses. The larger the scale of opinion, the higher the probability of triggering a pressure-type response and the greater the risk of damage to the industry’s image. Second, the type of public opinion and the attribution framework are the core variables that determine the direction of public opinion. The dominance of “antagonistic attribution discourse” will exacerbate the image crisis, while the presence of “consultative rational discourse” helps ease emotional confrontation and maintain the industry’s reputation. Third, the response process of the industry and the government have a reverse shaping effect on public opinion. Timely and transparent information release can guide public opinion towards rationalization; while lagging and passive responses may allow negative discourse to spread and solidify. Fourth, these observed dynamics are best explained by an integrated theoretical model linking institutional context, public legitimacy concepts, and institutional implementation.

5.2. An integrated theoretical model: discourse institutionalism and the image crisis

Based on the above analysis, this study proposes a three-element interpretation model for the image crisis analysis of the civil engineering industry, comprising three interrelated dimensions: institutional context, legitimacy concept, and institutional implementation.

The institutional context refers to the formal rules and informal practices embedded by the industry and the government in response to the crisis. In the Guangdong case, the relative lag in information release and the passive response constitute the core features of its institutional context, which aligns with the widespread phenomenon of delayed reporting of accident information in China’s construction industry [1]. In Guangxi, proactive inspection, rapid response, and timely communication constitute a more adaptive institutional context.

The concept of legitimacy refers to the dominant value judgments and attributional logic held by the public regarding specific issues. In the Guangdong case, “procedural justice” and “accountability” became the dominant legitimacy concepts, driving the public to make moralized judgments about the industry; in the Guangxi case, the legitimacy concepts of “scientific rationality” and “life first” prevailed. The formation of the concept of legitimacy is not entirely determined by objective facts, but is constructed through the game of different discourse subjects in the “framework competition” space provided by the institutional context.

The implementation of the system is reflected in the final image restoration effect and the policy outcome. When the institutional context fails to respond effectively to the public’s sense of legitimacy, the industry will face an image crisis and loss of trust. When the institutional context aligns with the concept of legitimacy, the industry may turn the crisis into an opportunity to showcase its professional image.

5.3. Implications

For governments, the core implication is to establish a “timeliness-first” mechanism for crisis communication. The case comparison underscores that timeliness and transparency in initial information release are paramount in shaping public opinion. In the Guangxi case, relevant departments proactively released core information, including “discovery of cracks - immediate road closure - zero casualties” within four hours, successfully seizing the initiative in defining the crisis and preventing the spread of rumors. Therefore, it is recommended that traffic and emergency management departments at all levels prioritize crisis information release plans as the primary component of emergency response. They should explicitly stipulate that, within the shortest time after confirming an incident, preliminary verified core facts and response attitudes be published through official social media channels. Even if the information is incomplete, efforts should first be made to establish trust with the public and avoid an information vacuum.

For the industry, the core implication lies in elevating crisis communication capabilities from a “technical auxiliary” to a “core strategic” component. The industry must overcome a historical tendency to prioritize technical response over strategic communication. Industry stakeholders should recognize that, in the social media era, the effectiveness of public opinion management following an incident is as crucial as technical rescue capabilities, collectively determining the trajectory of the industry’s image. Specifically, industry associations and large enterprises should lead in formulating specialized crisis communication plans for different types of engineering accidents, clarifying communication strategies under various attribution-of-responsibility scenarios, and avoiding remaining silent. Additionally, through active demonstration of safety management and technological innovation achievements on social media in daily operations, ‘reputational capital’ should be accumulated to serve as a buffer during crises. Only by integrating communication proactively into routine management can the industry effectively safeguard the hard-earned public trust amid occasional accidents.

6. Conclusion

In summary, this study demonstrates that the trajectory of an industry’s image following an accident is not predetermined by the event itself, but is decisively shaped by the interplay between the scale and type of ensuing public opinion and the timeliness and nature of the institutional response. The comparative cases of Guangdong and Guangxi illustrate that efficient, transparent communication can transform a crisis into an opportunity for image reinforcement, whereas delay and opacity can cement a narrative of failure, leading to a full-blown image crisis.

Theoretically, this study contributes by integrating discourse institutionalism with crisis communication theory, offering a novel framework to analyze the co-construction of industry image in the digital public sphere. Practically, it provides actionable insights for infrastructure regulators and the civil engineering sector to navigate the court of public opinion on social media. By highlighting the critical role of communication in preserving public trust, it holds significance for all high-visibility industries operating in risk-prone environments.

This study has certain limitations. Firstly, the research method primarily relies on secondary data analysis of publicly available online texts, lacking in-depth interviews or questionnaires with key factors such as event decision-makers, industry managers, and media practitioners, which limits a deeper understanding of the micro-mechanisms of the decision-making process. Second, this study mainly focuses on social media platforms (microblogs) in the Chinese context and can be extended to cross-platform and cross-cultural comparative studies in the future. Future research could be deepened in the following directions: First, by using methods such as in-depth interviews or questionnaires to obtain first-hand data, further explore the interaction patterns and decision-making logic of the government, enterprises, and the media in crisis events. Second, test the causal relationships and influence weights among the model’s variables using large-sample data analysis.

References

- [1] J. You. Research on Emergency Management of Safety Incidents in Large-scale Civil Engineering Construction. Nanjing Forestry University, 2018.
- [2] L. Zhou & Y. Lu. Online Public Opinion Response Strategies for Accident and Disaster Emergencies. *News Outpost*, 2024, (8): 38-40.
- [3] Z. Liu. Risks, Challenges and Countermeasures of Online Public Opinion Governance in the Post-Information Age. *Western journal*, 2024, (22): 63-69.
- [4] M. J. Zhou. Research on the Evolution Mechanism of Online Public Opinion in Accident and Disaster Emergencies. Xi'an University of Architecture and Technology, 2024.
- [5] W. Huang, Y. L. Liu, & D. Y. Zhou. An empirical study on the Multi-platform Evolution path of Emergency Online public opinion based on information ecology theory. *Journal of Intelligence*, 2025, 44(9): 164-175.
- [6] L. Sun & Y. N. Zhang. Research on the impact of information interaction between government and media on the dissemination of public opinion on the Internet. *Heliyon*, 2023, 9(6): 10-13.
- [7] W. Li, J. Wang, Y. Ren, D. Yin, & Y. Gu. Cross-spatial network analysis for public opinion risk identification in social media. *The Electronic Library*, 2024, 42(1): 1-20.
- [8] M. Karatas & M. Bek. The role of Twitter in crisis communication during the 2023 Turkey earthquake: A digital battleground for power and influence. *International Journal of Disaster Risk Reduction*, 2024, 100: 104210.
- [9] W. L. Benoit. Image repair discourse and crisis communication. *Public Relations Review*, 1997, 23(2): 177-186.
- [10] W. T. Coombs. Protecting organization reputations during a crisis: The development and application of situational crisis communication theory. *Corporate reputation review*, 2007, 10(3): 163-176.
- [11] K. L. Hinsberg & A. J. Lamanna. Crisis communication in construction: Organizational strategies for worksite fatalities. *Journal of Safety Research*, 2024, 88: 145-160.
- [12] K. L. Hinsberg & A. J. Lamanna. Exploring the impact of safety failures on construction organizations: Perceptions of leaders. *Journal of Safety Research*, 2025, 92: 1-12.
- [13] W. Jong. Beyond the snapshot: rethinking crisis communication theories in dynamic crisis situations. *Public Relations Review*, 2025, 51(3): 102586.
- [14] T. G. Page & C. A. Lin. A goodwill shield for crisis communication: Exploring the 'halo effect' of CSR activities. *Public Relations Review*, 2025, 51(4): 102602.
- [15] K. B. Shingwekar & P. Maurya. Too late, too rigid, too cold: Crisis communication failures that undermined organizational resilience—and how the 3E model could help. *Organizational Dynamics*, 2025: 101176.
- [16] X. Yu. Discourse Institutionalism: A Theoretical Explanation of Local Government Responses to Public Opinions - A Multi-Case Comparative Analysis Based on the 'Opinion-Policy' Connection Theory. *Journal of Journalism and Communication*, 2019, 26(5): 21-40+126.
- [17] P. Slovic. Perception of risk. In *The perception of risk*. Routledge, 2016: 220-231.