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From a Problem to the Problem System

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From ‘A Problem’ to ‘The Problem System’

Systemic design research towards the safety of sanitation workers in urban India

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This case study brings to the fore designer’s experience and challenges of intervening in a complex social system. The presentation refers to the “Need Assessment Study of Occupational and Health Hazards Faced by Desludging Workers in a City in India.” This study marked the first milestone towards understanding the safety concerns of sanitation workers in the larger context of safe sanitation practices in small and medium towns in India, where faecal sludge management is emerging as a viable way forward under the larger system of faecal sludge management. This paper focuses on the research methodology and processes used in the study in order to better understand how these might be replicated or used in other similar contexts. In particular, the presentation shall discuss the interrelationships at length to understand the dynamic, multicausal, and unpredictable nature of the complex social system as found during the study. Conducted in two Indian cities, the de-sludging operators offer cleaning services to households, establishments, and industries. (Mamta Gautam et al,19).

This presentation discusses the research design, its implementation, and findings leading to systemic design. This is being discussed from the perspective of the author as the lead design researcher for the project commissioned by IIHS.

KEYWORDS: Problem System, Sanitation, Complex adaptive system, Participatory research Methods, Behaviour Change.

RSD TOPIC(S): Cases & Practice, Health & Well-being, Policy & Governance

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Presentation summary

Faecal sludge management (FSM) is emerging as a practical solution for scaling-up urban sanitation in India. As implementation moves forward, practice-based knowledge is also growing. The occupational safety of de-sludging operators who clean onsite sanitation systems (OSS) is emerging as a critical issue in FSM. Owing to the paucity of information on the health, safety, and dignity of de-sludging workers (Mamta Gautam et al., 2019), the needs assessment study (NAS) places the issue of occupational safety within the larger context of the informal nature of the occupation and the overall vulnerability of workers. It posits that safety is more complex to address and requires collective action from multiple stakeholders across the sanitation value chain. Conducted in two Indian cities, the de-sludging operators offer cleaning services to households, establishments, and industries. (Mamta Gautam et al , 2019). This presentation discusses the research design, its implementation and findings leading to systemic design. This is being discussed from the perspective of the author as the lead design researcher for the project commissioned by the Indian Institute for Human Settlements (IIHS).

The presentation describes the navigation path adopted by the research team while making inroads with multiple stakeholders. The NAS idealises the safety of de-sludging workers as the key purpose of the sanitation system (Jones, 2014) in contrast to the existing unsafe practices. The case study draws parallels between the hierarchy of control and the Iceberg model, used as a framework to propose long-term, short-term, and high-impact strategies towards an idealised system.

Approach to the needs assessment study

The initial focus of the study was to understand the reasons why de-sludging workers did not use personal protective equipment (PPE) especially given the awareness and sensitisation facilitated by local urban bodies of the city. While the designer was aware of the relevance of PPE, it was the intent to understand stakeholder mindsets and aspirations that led to the design of research in an iterative manner. The study corroborates three safety concerns: physical injuries, inhalation of harmful gases and contact with sludge, as was identified through secondary research. However, it is the stakeholder's insights on their aspirations that paved the way for systemic design.

The following components of systemic design research are integral to the NAS.

Identifying key actant: The study posits the sanitation worker as the 'actor' in the system's centre towards which the technological interaction is to be applied. This socio-technical system suggests that the given individual may be acted upon within the aggregate contexts of these nested social systems. (Jones, 2014, p. 09).

Feedback Coordination: The study employed non-linear and continuous feedback approach (Jones, 2014, p. 18) for data collection and analysis. This is in sharp contrast to the traditional problem diagnosis tools and research frameworks, which focus on individual pieces of what is being studied. In effect, instead of isolating smaller parts of the system, the study expanded to an increasing number of interactions. The research and analysis tools were designed to understand the multicausal interrelationship between the behaviour patterns and mindsets of the multiple stakeholders leading to unsafe practices as recurring events.

Defining the boundary: The study focussed on primary stakeholders, who are vulnerable to the highest safety risks, and defined the service of de-sludging at the core of the socio-technical system in focus. The changing relationship dynamics between multiple stakeholders such as ULBs, safety officers, technocrats, manufacturers, farmers, implementation agencies, NGOs and community-based organisations were understood.

Understanding mindsets: By using analysis tools like 5 Whys and participatory research methods, the study gained insights beyond the apparent reasons for not wearing PPE. Such insights further emphasised the experiential/tacit knowledge of sanitation workers in and around safety and drew attention to integrate the same in proposing solutions.

Discussion and conclusion

In India, a mix of manual and mechanical methods are employed to empty and transport faecal sludge, which exposes the workers, who often work without adequate PPE and equipment. The following six components set the context of a complex adaptive system.

1. **Social:** the workers are subcontracted by private enterprises, either as a family occupation or as learned from peers from the same caste community.
2. **Economic:** the workers are employed on a salary basis and find other ways to make an additional income by cleaning tanks and taking high risks for small financial gains.
3. **Cultural:** taboo practices owing to the caste practices towards the workers exhibited by the clients/customers for the said service.
4. **Technical:** the workers have been migrating from manual processes to mechanical systems; however, technological advancements are further needed to address issues about blockages and air-blowing mechanisms.
5. **Environmental:** varied practices of disposing of faecal sludge matter and its unhygienic practices.

6. **Legal:** *The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act,* 2013, bans hazardous cleaning without any protective gear, cleaning equipment, and safety precautions. This legal component of the value chain further adds complexity to the socio-economic, socio-technical, and socio-cultural sanitation practice in the Indian urban context.

Given technological advancement in the sanitation industry, the systemic design acknowledges the practice of de-sludging as a socio-technical system (Jones, 2014). By doing so, the research has highlighted several entry points that are not conventionally associated with sanitation worker safety, ranging from workers' perspectives on their safety, their tacit knowledge, and the behaviour of household owners towards the maintenance of septic tanks. The systemic design research, despite its challenges and limitations in this field, was found to be an instrumental tool in bringing new perspectives to the problem as a network of problem systems. The same helped to propose a strategy to eliminate the source of hazard in addition to protecting the workers from safe.

While it is imperative to understand the issues of each stakeholder, this case study was able to overcome time constraints by placing the sanitation worker as the key actant. This was critical to understand the issues in depth, including those related to behaviour, mindset and values. These key insights were instrumental in addressing the root cause of the problem and strategies for eliminating the root cause of the hazards in the process. The study iterates that while the onus of safety is placed on workers, the same can only be achieved by creating a safe ecosystem and, most importantly, emphasising the need for behaviour change towards sanitation by other stakeholders.

References

1. Jones, Peter. (2014). Systemic Design Principles for Complex Social Systems. 10.1007/978-4-431-54478-4_4.
2. Emma Blomkamp (2022) Systemic design practice for participatory policymaking, Policy Design and Practice, 5:1, 12-31, DOI: 10.1080/25741292.2021.1887576
3. Mamta Gautam, Kavita Wankhade, Gayathri Sarangan, Srinithi Sudhakar. Framework for addressing occupational safety of de-sludging operators: A study in two Indian cities, Journal of Environmental Management, Volume 289,2021,112243, ISSN 0301-4797,https://doi.org/10.1016/j.jenvman.2021.112243.
4. Juan de la Rosa, Stan Ruecker, Carolina Giraldo Nohora, Systemic Mapping and Design Research: Towards Participatory Democratic Engagement, She Ji: The Journal of Design, Economics, and Innovation, Volume 7, Issue 2,2021, Pages 282-298, ISSN 2405-8726,https://doi.org/10.1016/j.sheji.2021.04.001.
5. Josina Vink, Katarina Wetter-Edman, Kaisa Koskela-Huotari, Designerly Approaches for Catalysing Change in Social Systems: A Social Structures Approach, She Ji: The Journal of Design, Economics, and Innovation, Volume 7, Issue 2,2021, Pages 242-261, ISSN 2405-8726,https://doi.org/10.1016/j.sheji.2020.12.004.
6. Downs, Simon (2016): I know this one, but the answer is complex. Loughborough University. Conference contribution. https://hdl.handle.net/2134/23531