

# High reliability in a constrained environment

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# Research Questions

- What are the constraints faced by Highly Reliable Teams? How do these constraints develop?
- How do these constraints affect how HRTs operate?



# Motivation

- Constraints, at times, may restrain a team's ability to operate in the most efficient manner.
- A deeper understanding of how individuals and groups interact with regulations can improve policy design.



# Methodology

- Qualitative investigation through ethnographic techniques to identify patterns and data.
- Develop a taxonomy that organizes the continuum of constraints.



# Highly Reliable Teams (HRT)

- Furthered the previous work on reliability, such as Weick and Sutcliffe (2007) , to conceptualize Highly Reliable Teams which share many attributes of Highly Reliable Organizations.
- Not just a fixed subset of an organization, but rather a flexible unit that draws from a pool of qualified members to respond to missions.



## HRT's Cont.


- Positive outcomes are expected and failure is high consequence.
- HRTs solve complex problems through a 3-step process: Problem anticipation, response, review.
- Examples: Surgical teams, search and rescue, air traffic control, ship navigation, etc.



# Complex Problems

- Complex problems are characterized by unfamiliarity, dynamic conditions, and high consequences in the case of failure.
- Requires a sequence of decisions and each decision may provide potentially useful information for subsequent decisions in a dynamic environment (Edwards, 1962).
- “Decisions have to be made in real time” (Brehmer, 1992).

# Problem Solving Process

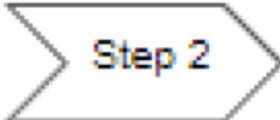


Step 1

## **Problem**

### **Anticipation**


Based on previous experiences, teams forecast the likely circumstances of future missions and prepare accordingly.



Step 2

## **Response**

A team is assembled and deployed. Leadership determines how predetermined operating procedures will be employed.



Step 3

## **After-action**

### **Review**

What went well? How can we improve?





## Formal Constraints

- Developed by teams and regulators in the problem anticipation stage.
- Designed to lower the risks of HRT operation, which include physical harm and legal liability.



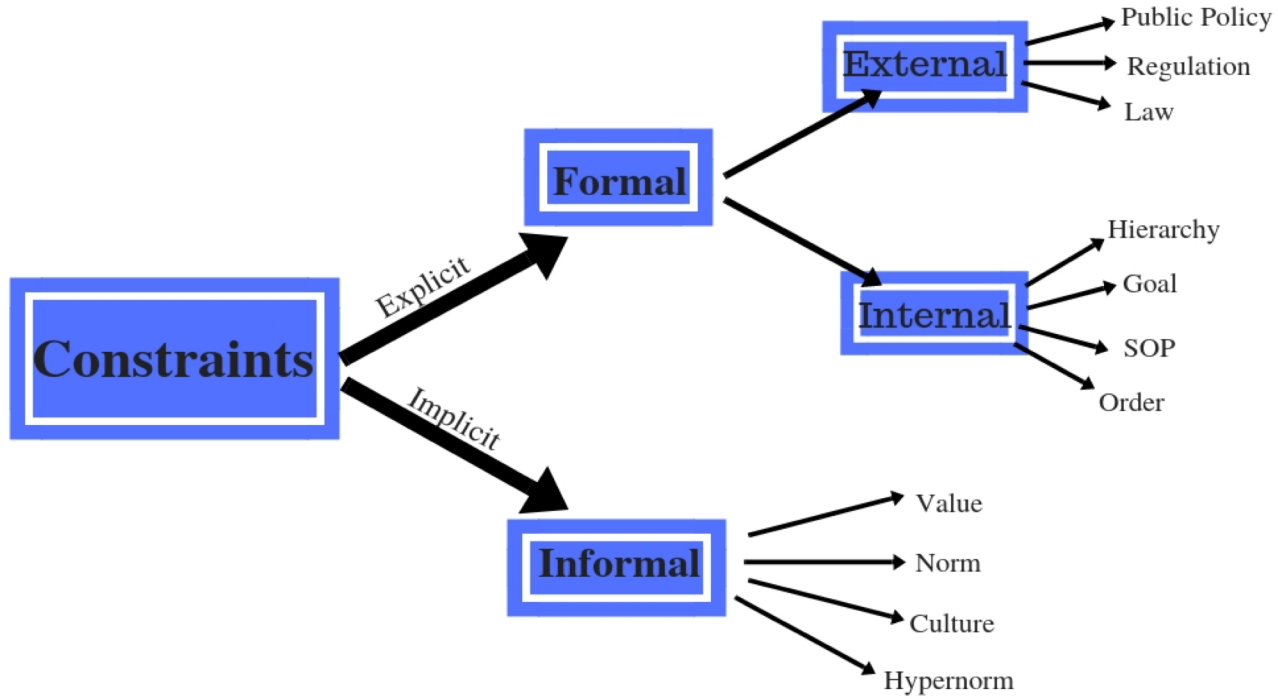
## Formal Constraints Cont.

- Limited by ability to foresee the circumstances of future missions -- Cannot prescribe a course of action for all possible circumstances.
- Constructed and enforced through deliberate processes.



# Informal Constraints

- Are not limited by problem anticipation and thus complement formal constraints by guiding team decision making in any situation.
- Enforced by social sanctions and pressures.





# Risk Mitigation and Operational Success

- Formal constraints incorporate the lessons learned from previous missions to provide structure that increases efficiency and safety.
- Informal constraints, such as values and social norms, provide criteria for decision making, especially to balance taking risks and operating safely.

# Innovation in HRT operations

- Constructive deviance and after-action reviews lead to improvements of formal constraints.
- There is some resistance to new technology and techniques (Duemmel, 2017)





# Conclusions and Future Applications

- Constraints are essential to HRT success, though regulators and team leadership should be cautious of implementing formal constraints that impede teams.
- Highly Reliable Team training and development. Encourage mission reviews and feedback cycle.