How Principles of High Reliability Organizations Relate to Corrections

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HIGH RELIABILITY ORGANIZATIONS are about the science of safety. Systems that are complex, with tightly coupled processes (such as air traffic control, nuclear reactors, wildfires, railroad freight, prison logistics) predict vulnerability for major system accidents.[1] Complexity is a function of the number of interactions in a given system as well as how veiled and difficult they are to understand. Tightness in the coupling is reflected in how fast cause and effect transpires through a system—systems with loose coupling have slack in one or more dimensions (time, space, distance). In the past couple of decades researchers[2-6] have found that agencies that operate according to certain principles, henceforth referred to as High Reliability Organizations (HROs), both prevent accidents and perform distinctly better during system accidents than other organizations.

What makes reviewing these HRO principles relevant to corrections is that they appear to apply across increasingly diverse settings[7] and most corrections systems arguably qualify as complex and tightly coupled settings. In addition, given the immediate intersection of trends in the field (e.g., downsizing[8-12]; EBP[13-16]; and wide-spread greater adaptation of business models[17-19]), any science or craft that presents methods for achieving greater reliability in corrections should hold some promise.

This brief review of HRO methodology will summarize some of the literature and provide an overview of the primary principles found to be guiding HROs today. It will then serve as a framework for looking at some of the particular current challenges corrections is facing, determining what, where, and how HRO strategies might be of some benefit or service to the field. Beyond the prominent issue of safety (whether in the courtroom, secure settings, or out in the community), there are also significant and growing concerns about the field's capacity to manage implementation,[20-22] complex processes,[23-26] and crisis[27] (not directly related to safety but to organizational and system integrity, i.e., down-sizing, loss of mission, etc.).

HRO Research Summary

In the 1980s, HRO studies began to emerge in organizational research. Since its infancy, HRO has drawn inspiration from Charles Perrow's ground-breaking work in 1984 on Normal Accident Theory (NAT),[1] which described complexity and tightly coupled technological systems as characterizing hazardous and risky enterprises. In Perrow's NAT framework, systems such as chemical plants, marine traffic, and nuclear power plants are all quite vulnerable to trivial events cascading through the system in unpredictable ways that can ultimately cause very severe consequences. Though Perrow remains skeptical about the degree to which complete remedies exist for complex and tightly coupled systems,[28] HRO investigators[29] have enthusiastically committed themselves to illuminating what the common mechanisms are for producing reliability and reducing risk across hazardous and risky systems.

In 1987, Karl Weick[5] pointed out how trial and error approaches, commonplace in less risky and demanding systems, are not viable in hazardous ones. Consequently other alternative strategies are employed to address what he termed the *problem of requisite variety*: when "the variety that exists in the system to be managed exceeds the variety in the people who must regulate it."[5] (p112). Simply stated, in order to operate adequately, a complex system must be matched with a requisite and comparable level of variety of information, communication, and responsiveness within the organization managing the system. How non-technical or human systems have stepped into the breach to address this need for requisite variety is fascinating.

Researchers at Berkeley[30, 31] and University of Michigan[32, 33] determined that HROs such as nuclear power plants, aircraft carriers, and forest fire-fighting units have evolved structures that enable them to achieve well-coordinated centralization and decentralization[30, 34, 35] effective decision-making. This balance in structure serves to enhance and optimize an agency's options (variety) when neither rules nor standardization are well-suited for addressing emergencies that have no clear precedent.[36] A variety of strategies have evolved that enable this unique flexible shifting from centralized to decentralized control. These have come under the attention of HRO investigators.

A couple of examples of these morphing structures are incident command systems (ICS) employed by fire departments and crew resource management (CRM) used by airlines. ICS are now widely used by police and firefighters of all types to quickly and efficiently erect a management structure[32] in any emergency situation of sufficient size to ultimately draw upon multiple and diverse agency staff. The ICS originally was created as a state, local, and federal cooperative effort to reconcile management conflicts occurring in huge inter-jurisdictional fires occurring in the 70s in California. However, ICS were

soon extended into an all-risk system for almost any kind of emergency.[37] Investigators have determined that ICS depend largely on three factors: 1) structuring mechanisms, 2) cognition management methods, and 3) constrained improvisation.

Structuring mechanisms allow staff to elaborate better solutions, seamlessly switch roles, migrate decision authority when appropriate, and reset the system thinking. Frequent role switching similar to what air traffic controllers routinely do with co-workers and their supervisors facilitates greater teamwork and broadens the perspective. Enabling decision-making to flexibly migrate to where the current informal expertise exists versus where the formal authority resides corrals more tacit knowledge and immediate, granular information into decision-making. Decentralizing decision-making, under non-routine decision-making conditions, assures "that individuals closest to the problem stimuli can react and make better decisions."[30, 31] Finally, when relevant assumptions are suddenly overturned in the face of new evidence, mechanisms for immediately and collectively resetting or "refreshing" the basic strategic vision prove to be very helpful.

Cognition management methods promote developing operational representations necessary for team clarity and coherence. These same methods also promote shifting and nesting key staff responsible for directing and coordinating diverse staff, very similar to what air traffic controller systems must do to manage peak flows.[38] In HROs, it is critical to integrate information about complex, highly interactive operations and performance into a single picture that is perpetually maintained—referred to in diverse HRO settings (such as aircraft carriers, nuclear plant control rooms, etc.) as "having the bubble."[36] For example, someone ultimately must assume all responsibility for monitoring the flight deck of an aircraft carrier or the instrument panel in the control room of a nuclear plant and they therefore would "have the bubble."

The final factor associated with ICS, *constrained improvisation*, calls for recognition and readiness to improvise, given the many unique and extreme possible emergency situations, but with limited tolerance for too much "free-lancing." In emergency situations tools may need to be improvised at the operations level. At a higher management level tactics and rules sometimes also need to be improvised in emergencies. By imposing prescribed limits for improvisation within a three-layer control system—Bronze = operational; Silver = Tactical; Gold = strategic—ICUs compartmentalize decision-making in a manner that accommodates some on-the-ground improvisation, but within prescribed limits.

Technically, ICUs are not HROs. ICUs and other similar adaptations (such as Crew Resource Management/CRMs) represent structural responses to potential or real disasters that have informed some of the organizational development of HROs. The latter go beyond these structural adaptations by inculcating principles that permeate an agency and culture in a manner that supersedes organizational structure.[36]

The principles associated with high reliability were found in a variety of different types of organizations dealing with hazardous work. Roberts[3] determined that built-in redundancy (e.g., buddy-systems, multiple means of communication) and conditioned sensitivity to possible failure in nuclear-powered aircraft carriers enhanced reliability. Babb and Ammons[39] similarly reported that training transport officers to anticipate the unexpected was related to high reliability in transporting prisoners. Research in chemical processing plants[40] demonstrated a relationship between coherent incident reviews and cyclic crises. In working with three major airlines, Gittell[41] found measures of relational co-ordination significantly correlated to multiple measures of organizational performance. After reviewing the accident research on three distinctly different hazardous systems (air traffic control, nuclear power, and nuclear aircraft carriers) Reason, et al.[42] learned that flexible authority structures (routine, high-temp and emergency) were common in all organizations and greatly facilitated communication switching from largely vertical to horizontal when necessary. In a systematic review of catastrophic accidents like Exxon Valdez, Challenger, 1999 Mar orbiters, Roberts and Robert[43] indicated that managerial causes such as lack of deference to expertise and oversimplification of processes contributed more system failure than design flaws. Heedful team interactions that reinforced a preoccupation with failure (e.g., well-timed extra briefings, staff access to multiple and redundant communication systems, etc.) and sensitivity to operations were attributed to minimal error on flight decks by Weick and Roberts.[32] In investigating forest-fighting crew performance, Weick[32, 44, 45] found resiliency based on learning and norms of respectful interaction to facilitate the avoidance of catastrophe.

Perhaps less hazardous but nevertheless complex and tightly coupled, the medical care industry has determined[6, 46] that many errors in patient care relating to flawed patient information exchange can be effectively addressed through applications of HRO concepts. Subsequently the National Patient Foundation of the AMA has adopted and nationally piloted an extension of HRO findings in health care settings.[47, 48] The NASA Office of Safety and Mission Assurance has instigated a routine survey (Performance Evaluation Profile) similar to the Navy's Command Safety Assessment Survey predicated on five elements of HROs[49] that structure organizations for greater reliability[47] Libuser lists them as:[50]

1. **Process auditing:** An established system for ongoing checks and balances designed to spot expected as well as unexpected safety problems. Safety drills and equipment testing are included. Follow-ups on problems revealed in previous audits are critical.
2. **Appropriate Reward Systems:** The payoff an individual or organization realizes for behaving one way or another. Rewards have powerful influences on individual, organizational, and inter-organizational behavior.
3. **Avoiding Quality Degradation:** Comparing the quality of the system to a referent generally regarded as the standard for quality in the industry and insuring similar quality.
4. **Risk Perception:** Includes two elements: a) whether there is knowledge that risk exists, and b) if there is knowledge that risk exists, acknowledging it, and taking appropriate steps to mitigate or minimize it.
5. **Command and Control:** Includes five processes: a) decision migration to the person with the most expertise to make the decision, b) redundancy in people and /or hardware, c) senior managers who see "the big picture," d) formal rules and procedures, and e) training-training-training.

More recently HRO mechanisms have found their way into data processing[51] and human resource system design.[52] There is a growing trend showing the ascendancy of HRO principles across a progressively wider array of business contexts, many of which no longer share an association with hazardous work. However, according to a Fast Company article,[53] there is nevertheless a financial or social payoff for these latter sectors through

the additional reliability and adaptability HRO principles promote.

HRO Principles

In their book *Managing the Unexpected: Assuring High Performance in an Age of Complexity,* Karl E. Weick and Kathleen M. Sutcliffe[36] articulate five principles that they find in all HROs to varying degrees. These principles have formed a touchstone for some of the above subsequent research, system reengineering and newfound HRO applications. The five guiding principles are:

- **Preoccupation with Failure**
- **Reluctance to Simplify**
- **Sensitivity to Operations**
- **Commitment to Resilience**
- **Deference to Expertise**

The above principles tend to interpenetrate, inform, and influence one another. Similar to electrical currents in a power grid, specifying how these HRO principles are related to each other is difficult, yet they each "work" and together produce a crucial resource (in the case of HROs, mindfulness[34, 54]). A brief description of each principle along with some examples of specific corrections operations that might fall under the influence of a respective principle follow.

Preoccupation with failure is central to HRO operations for several reasons. First, adopting the mindset that anything can go wrong at any time engenders in personnel a heedful orientation to their work, their co-workers, and themselves; it enables them to maintain the necessary edge of readiness. Second, when potential failure becomes part of the routine focus, errors are more readily detected early on, within their tightly coupled and fast interacting processes. When errors are identified earlier, their ultimate resolution is made easier and more certain. Third, clearly identified errors and failures provide grist for deeper shared learning in subsequent debriefing. Finally, cultivating a positive regard for failure detection promotes unique norms of practice that positively reinforce recognition and communication errors and even suspected errors. In an HRO, the people detecting an error or problem own that problem, until they can find someone with greater expertise for remedying it.

Given the different motives for obsessing about failure, *preoccupation with failure in corrections* can take many possible forms. In institutions this principle recommends heedful shift changes and related briefings, the utmost care in staff hiring, training, and inmate intake processes, along with ever-vigilant inmate transport, classification, and sanctioning procedures. A fixation on failure in community or field supervision, on the other hand, shows up as fewer error-prone assessments, case plans, and poorly aligned case management efforts. It also includes less treatment expenditures that fail to successfully target criminogenic case priorities.

Reluctance to simplify is marked by an active appreciation for maintaining a full, albeit never complete, operational awareness. Holding a more accurate and nuanced picture of current operations is given a premium at all levels within an HRO. To this end, "boundary spanners" (persons with diverse experience, skepticism about party-line knowledge and abilities to incorporate updated and more diverse views) are valued, as well as truly deep (inter-functional) diversity in the workforce. Simplification translates to a loss of information, detail, and more diverse representations of what is going on. Loss in complexity reduces adaptability. The ability of staff to attend to more things, shift and maintain more interpretations of a given situation, and communicate more diverse ideas fosters adaptability. "To misread local innovations and workarounds as signs of inefficiency rather than effective adaptations (can) make the difference between profit and loss." [36](p12)

At the present, the benefits to be obtained from a *reluctance to simplify in corrections* are enormous. The research in the field of corrections is coalescing as never before. A knowledge base for Evidence-Based Practice (EBP)[55] now exists, with guiding principles[13, 56, 57] unique to corrections. Agencies struggling to reconcile their existing practices with EBP are encountering many current correctional practices in which convenience or expediency have eviscerated any potential logical bearing on public safety (e.g., shipping inmates far from their families and homes, basing the focus of supervision on terms and conditions set by either judge or board, ignorant of the individual offender's criminogenic needs). Furthermore, while the new EB practices and principles are based on sound scientific inquiry and evidence, they are not immune to poor translation and implementation themselves. A new science is emerging concerning the business of implementation[21, 58] in general. Leading investigators in this research are quick to point out how most government implementation results in only "paper" nominal levels of implementation,[20] largely due to inadequate and over-simplified implementation strategies (e.g., train and pray). In an era of fast-paced information transfer, coupled with progressive and prolonged budgetary constraints, the evolution of corrections will be contingent on smart research translation, smart innovation, and smart implementation.

A *sensitivity to operations* is exemplified by a widespread concern for, if not awareness of, the granular details of routine operations. This is an ongoing and active concern for the unexpected, "latent failures"[59]—the system loopholes where inconsistencies in staff supervision, performance reporting, key procedures, and briefings exist. "The big picture in HROs is less strategic and more situational than is true of most other organizations"[36] (p13). Moreover, HROs are aware of how inextricable the linkage is between sensitivity to operations and sensitivity to relationships—that most reasons for withholding information are relational (e.g., fear, indifference, ignorance).[36] Consequently, HRO managers place a great deal of emphasis on respectful communication that makes more, not fewer pertinent things discussable.

A *sensitivity to operations in corrections* includes a willingness to more frequently examine not only practices within our correctional systems but also our assumptions about these practices as well. Just as in any other field, corrections managers who have ongoing, granular familiarity with their respective operations will be more successful. In addition, corrections managers willing and able to question the received logic or assumptions within the operational processes they are responsible for may find new reason and opportunities for innovation and re-engineering these same systems. On one hand, collegial norms that are out of date and inconsistent with EBP will need to be diagnosed and brought to the "surface" for repair. In turn, staff will need to give birth to new norms, centering around transparency[60, 61] and ongoing learning in order to sufficiently support EBPs throughout each system's myriad of existing communities of practice.[62, 63] All of these adaptations are virtually impossible without significant sensitivity to operations in corrections.

Deference to expertise enables higher-level decision-making at the line level. In HROs the lines of authority shift dramatically and effectively according to the tempo of operations. In normal activity, with reasonable slack in the system processes, decisions flow from the top. When operations shift into a high-paced tempo, decisions migrate to where the expertise is on the line level, closest to people who can capture the fullest picture

of the enterprise. If activities escalate to an emergency state, pre-established emergency structures (e.g., ICUs) shift into practice to provide additional stability and efficiency. This essential flexibility with authority inherent in HROs provides a template for reconciling central versus local control issues and the ability to fluidly migrate authority to where the people with the most expertise exist.

Deference to expertise in corrections is a principle that provides a remedy for some of the negative aspects of command and control organizations, without eliminating the benefits. This principle provides a key for when the chain of command in corrections can and should fluctuate so that deeper expertise can be drawn into operational decisions related to implementation (high-tempo activity) and crisis (emergency tempo). In institutional and residential settings, often it is the line staff who have the deeper feel for the current climate and culture of the setting. Therefore, mechanisms that deliberately and flexibly migrate authority for decisions to line staff with the expertise can help assure that the best understanding of a particular operation's granular reality is involved in certain kinds of critical decisions. Escape proceedings, riot control, and mass transfers of inmates are a few examples where line personnel potentially may have considerable expertise that can be effectively tapped through pre-arranged ad hoc management supervision structures that kick into place only under emergencies. Implementation of unique and new protocols such as offender screening (DNA, custodial levels or risk levels), search techniques, custody level adjustments, and inmate transfers reflect potentially high-tempo institutional activities, where closer reliance on line expertise may benefit the agency. Client staffings, drug or specialty court hearings, PSI formulations, and revocation hearings all represent opportunities where field supervision staff might also be more empowered to make or contribute in key case (or policy) decisions. Additional opportunities may exist for tapping line PO expertise when norms of greater transparency for casework are in place, and open recognition of expertise and skills in EBPs such as Motivational Interviewing, cognitive-behavioral coaching, social network enhancement, etc. are attained.

Commitment to resilience builds "informed gumption" on the part of staff. Staff that keep errors small, frequently learn from their errors, and know how to improvise when necessary tend to keep systems functioning well: Robert Pirsig ended up most simply defining quality in his treatise on that topic, *Zen and the Art of Motorcycle Maintenance*[64] as processes that involve gumption. There is this aspect of taking enough pride in what we are doing so that one improvises when necessary or learns to take responsibility for evident errors until someone comes along who is better qualified. Errors are not ignored. Moreover, when errors or out-of-the-ordinary circumstances are encountered, as stress levels go up, staff learn the importance of resisting the temptation to narrow their focus to tunnel vision and instead, go the extra distance to take in more cues and information for subsequent problem-solving.

Both organizations and individuals can be described as resilient.[54] Resilient individuals have transformed themselves and cultivated a basis for judgment of their own decisions and for transformation of the organizations that they belong to.[65] HROs learn to rely upon this kind of innovative or adaptive expertise. A resilient organization is open to error and whatever it can learn from its various manifestations.

A *commitment to resilience* in corrections manifests in a willingness to become more transparent and to engage in career-long learning. A certain expertise is required on the part of correctional officers in order to sort out patterns within various "incidents" in a correctional setting and determine when a subsequent "disturbance" or riot might be due to occur. In a similar fashion, parole and probation officers sensitive to small failures and backsliding on the part of individuals on their caseloads are in a stronger position to predict and intervene prior to full relapses. Correctional staff are surrounded by life-long learning opportunities; how resilient they are is a function of whether they see and engage these opportunities.

The five above principles associated with HROs are interdependent. A heedful agency that shares and maintains a steady concern for failure is likely also to be prone to avoiding oversimplification. Organizations that more flexibly tap their existing expertise would generally be apt to learn quickly from mistakes and therefore be more resilient. And, it would follow that the opposite would be true as well (that is, agencies that can only tap their expertise very rigidly would be less inclined to learn from their mistakes). Consequently, which principle an organization explores and builds upon first may not be all that crucial. What is important is determining if the benefits from adopting HRO principles outweigh the costs.

Conclusion

Inmate disturbances escalate into uprisings and riots in at least a few prisons in the U.S. each year. Management of inmates is a tightly coupled process, within a complex interpersonal environment. Every 10 years or so there is a major catastrophic riot: Attica, NY (1971); Santa Fe, NM (1980); Lucasville, OH (1993). In addition, every year a very limited number of individuals on probation or parole supervision in the community commit heinous, terrible high-profile crimes. The above syndromes, not to mention escapes, disease epidemics, and a few others should qualify corrections as a high-hazard industry. Isn't it time therefore to systematically consider and integrate some of these HRO principles more deeply into the correctional enterprise? If the latter associated financial, credibility, and liability costs for maintaining non-reliable systems aren't sufficient incentive, consider the opportunity costs.

The U.S. is moving into an era of unprecedented budgetary constraints. A process of down-sizing for the country's corrections systems is likely and in fact already a reality for some states for a variety of reasons.[66] At the very same time that these changes are taking place, there is a movement underway within the field towards EBP and new abilities to more effectively correct risk factors in the populations under supervision. After almost 20 years, this movement is beginning to gain some momentum and quite possibly a critical mass in understanding and implementation capacity.[19, 67, 68] What are the odds that adopting HRO principles can assist corrections in navigating these difficult transitions? There should be little doubt that managing smaller but more homogeneously high-risk populations successfully, with reliable implementation of interventions that effectively reduce subsequent recidivism would be a real value-added proposition to society and its future.

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