

Risk Perception & the Introduction of a P-Phrase Risk Assessment Tool

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Quantitative Risk Assessment

- usually seen to be more impartial
- do not take into account factors that affect risk perception, e.g. affect heuristic, cultural effect, social amplification of risk etc.

Quantitative Risk Assessment

- However, QRA also depends on historical data
- e.g. a calamity brought about by the failure of a system component will result in revision of the failure rate of that component
- hence given probability of occurrence $\uparrow \rightarrow$ resources allotted \uparrow
- e.g. funding of the space program by NASA \uparrow after the Challenger space shuttle wreckage

Quantitative Risk Assessment

- Resources $\uparrow \rightarrow$ no. of mishaps \downarrow
- Correspondingly perceived probability of occurrence after some time \downarrow
- so QRA to a certain extent is still subjective

Quantitative Risk Assessment

- also after a calamity, the public awareness will rocket ↑ on that type of event
- e.g. the September 11 attack: after that the risk of terrorist attack will be perceived to be much ↑
- but with the passage of time, such awareness will ↓
- e.g. soon after the Asian Tsunami, the resorts are rapidly rebuilt

More Objective Risk Models?

- look back at the development of risk models
- started with a 2M (Man-Mother Nature / Media) Risk Model, the Heinrich Domino Theory of Unsafe Act (Man) and Unsafe Condition (Mother Nature or Media) in the 1930's
- MacDonald's 3M (Man-Machine-Mother Nature / Media) Risk Model similar to DeJoy's Human Factor Model in 1989

More Objective Risk Models?

- then Wigglesworth's 4M (Man-Machine-Method (Process or Operation)-Mother Nature / Media (Physical & Behavioral Environment)
Ergonomic Risk Model
- then a 5M (Man-Machine-Material-Method-Mother Nature / Media)
Production Model

More Objective Risk Models?

- using a more gender-neutral term of “Person” instead of “Man”, the 5M (Man-Machine-Material-Method-Mother Nature / Media) Model is converted to a 5P (Person-Plant-Production Material-Process-Place) Model

More Objective Risk Models?

- Shortcoming in this type of ergonomic / production models is that those management-type elements such as risk policy, risk management plan, risk amelioration monitoring and review etc. have not been taken into account

More Objective Risk Models?

- suggest to amalgamate the 5P Risk Model with the components in a Plan-Do-Check-Act cycle of a Safety Management System (e.g. ISO 14001 or OHSAS18001) or Risk Management System (such as the AS/NZS 4360)

10-P Risk Models

- the additional elements are:-

(i) **P**olicy

(ii) **P**lanning

(iii) **P**rogram Implementation

(iv) **P**erformance Monitoring

(v) **P**eriodic Review & Auditing

P-Phrase Models?

- Within these 10 P-Words / P-Phrases we can elaborate using more P-subwords / P-subphrases

P-Word: Person

- Psychological and / or physiological state of the individuals
- Proposals on safety improvement
- Personal attributes of employees
- Public image of the company
- Perception of other stakeholders

P-Word: Plant

- Proper fencing of dangerous parts of plant
- Pressure likely to cause injuries
- Physical soundness
- Position & posture of operators & others
- Potential failure

P-Word: Production Material

- Problem identification mechanism
- Preparation of safety information, e.g. MSDS
- Prefabricated materials to safety specification
- Product design
- Powered mechanical aids for handling materials

P-Word: Process

- Provision of safety features
- Procedures on OHS
- Practices on OHS
- Permit-to-work systems
- Product safety

P-Word: Place

- Property damage
- Premises maintenance
- Perimeter / precinct access / egress
- Passageway kept clear
- Physical environment healthy

P-Word: Policy

- Philosophy vs company vision
- Principles on compliance to legal & best trade practice
- Parameters & objectives
- Priorities
- Power delegation

P-Word: Planning

- Program launching
- Practicability of implementation
- Plans on various issues
- Preventive & protective measures
- Precautionary measures

P-Word: Program Implementation

- Promotion
- Publicity of OHS information
- Publication of OHS manuals etc.
- PPE Program
- Partnership with supplies & contractors

P-Word: Performance Monitoring

- Proficiency of operators
- Professionalism of middle managers / supervisors
- Participation of senior management
- Positive safety culture
- Penalty for violation of safety rules

P-Word: Periodic Review & Auditing

- Preliminary & comprehensive findings on efficiency & effectiveness
- Probable long / short term risks
- Platform for benchmarking
- Previous audit results
- Progress & continual improvement

Example: Application of 10P-Phrase Risk Model to Fire Drill Risk Assessment

- Using these P-subwords / P-subphrases and apply to a fire drill risk assessment

P-Word: Person

- **Psychological state of the individuals:** Fire Drill Experience of participants - informed drill or surprise drill (1 mark)

- **Physiological state of the individuals:** Mobility impaired, visually impaired, the aged (seniors), toddlers, pregnant ladies (Should they be exempted, or be assisted if they participate?) (1 mark)

- **Proposals on safety improvement:** Fire Drill Response Questionnaire (2 marks)

- **Personal attributes of employees:** Security or FM personnel - trained in the use of fire extinguishers? Ability to undertake crowd control? Assignment of fire wardens (2 marks)

- **Public image of the company:** Lack of previous drill will negatively impact company image; same for chaos in drill (2 marks)

- **Perception of other stakeholders:** Other tenants in the same building? (2 marks)

P-Word: Plant

- **Proper fencing of dangerous parts of plant:** Staircase provided with sound railings (2 marks)
- **Pressure likely to cause injuries:** Control of crowd from rushing down (2 marks)
- **Physical soundness:** Fire alarm system including alarm bells & PA system (if any) effective (pre-drill checking) (2 marks)
- **Position & posture of operators:** Siting of guards, fire wardens (2 marks)
- **Potential failure:** Brainstorm with fire team members for possible failure modes and prepare contingency arrangements, e.g. Any Plan B if it suddenly rains (2 marks)

P-Word: Production Material

- **Problem identification mechanism:** Any defective materials that may hamper the drill, e.g. failure of fire alarm system to sound (2 marks)
- **Preparation of safety information, e.g. MSDS:** Fire orders and notices on notice board, with fire evacuation routing map clearly showing fire evacuation routing (2 marks)
- **Prefabricated materials to safety specification:** Exit signs, evacuation signage, fire wardens to wear reflective vests for easy identification (2 marks)
- **Product design:** Setting of assembly point to minimize danger – Need to be away from building, but not too far, and if possible avoid crossing the street (2 marks)
- **Powered mechanical aids:** Loudhailers, hand torches (2 marks)

P-Word: Process

- **Provision of safety features:** Provision of first aid boxes and first aiders, traffic control if need to cross the street (2 marks)
- **Procedures on OHS:** Fire evacuation procedures (2 marks)
- **Practices on OHS:** Organizers to go through the procedures and a mock drill first, including floor check (2 marks)
- **Permit-to-work systems:** Authorized personnel to take up certain roles, e.g. Facility Manager overall control, fire wardens of individual departments / sections to do floor checks and roll calls, return to building only when authorized (2 marks)
- **Product safety:** All untoward incidents / accidents / injuries should be reported and investigated for improvement (2 marks)

P-Word: Place

- **Property damage:** Damaged doors that fail to open properly (2 marks)
- **Premises maintenance:** Any defect found on the way, e.g. blown lighting in staircase, wet floor due to water drippage (2 marks)
- **Perimeter / precinct access / egress:** Blockage of fire escape route outside building, e.g. exit from rear yard (2 marks)
- **Passageway kept clear:** All fire escape routes kept clear (2 marks)
- **Physical environment healthy:** Staircases not stuffy, adequately lit (2 marks)

P-Word: Policy

- **Philosophy vs company vision:** Any risk policy? (2 marks)
- **Principles on compliance to legal & best trade practice:** Any local law and / or corporate guideline on such practice (2 marks)
- **Parameters & objectives:** Desirable evacuation time & roll call time (2 marks)
- **Priorities:** All personnel should treat this as a real fire and evacuate except those required to stay behind for security, and / or the underprivileged ones (2 marks)
- **Power delegation:** Authorities delegated to in-house or outsourced staff / security guards (2 marks)

P-Word: Planning

- **Program launching:** Fire safety plan incorporating fire evacuation planning (2 marks)
- **Practicability of implementation:** Internal factors: selection of date and time - busiest or slackest time of the year? How about external factors? (2 marks)
- **Plans on various issues:** Identification of any other unplanned issue, e.g. what to do if there is concurrently a real fire? (2 marks)
- **Preventive & protective measures:** Lift homing to minimize the chance of participants using lift; clearing the pathways / unlocking gates / doors before the drill (2 marks)
- **Precautionary measures:** Participants to be evenly distributed to avoid overloading of any staircase (2 marks)

P-Word: Program Implementation

- **Promotion:** Notified to all parties concerned (2 marks)
- **Publicity of OHS information:** Fire evacuation materials available to all? (2 marks)
- **Publication of OHS manuals etc.:** Fire evacuation procedures available to all / posted on notice board? (2 marks)
- **PPE Program:** First aid materials / torches etc. adequately provided and maintained (2 marks)
- **Partnership with supplies & contractors:** Evacuation of contractor workers too? (2 marks)

P-Word: Performance Monitoring

- **Proficiency of operators:** Training of fire wardens, security staff etc. (2 marks)
- **Professionalism of middle managers / supervisors:** Knowledge and training of managers / supervisors on fire evacuation (2 marks)
- **Participation of senior management:** MD's / CEO's / Directors' / Senior Managers' participation (2 marks)
- **Positive safety culture:** Anyone unnecessarily staying behind? (2 marks)
- **Penalty for violation of safety rules:** Any reprimand / penalty for violation? (2 marks)

P-Word: Periodic Review & Auditing

- **Preliminary & comprehensive findings on efficiency & effectiveness:** Evacuation / Roll call timing within criteria?

Any abnormalities? (2 marks)

- **Probable long / short term risks:** Applicable to other crisis scenarios? Any overall crisis management planning? (2 marks)

- **Platform for benchmarking:** Comparable exercise performed by peers / trade partners (2 marks)

- **Previous audit results:** Comparison with previous fire safety evacuation audit results (2 marks)

- **Progress & continual improvement:** Any better way of evacuation? (2 marks)

Conclusion

- 10 P's (10 mark for each P) giving a total of 100, see how much score?
- No universal model that can tackle all risk situations
- Proposed idea comes from Risk Phrases used in Chemical Risk Assessment that can be generically applied to many areas of concern
- The P-Words or P-Phrases form checklist type of reminders so that assessment can be more impartial and comprehensive