7th International Conference on Building Resilience; Using scientific knowledge to inform policy and practice in disaster risk reduction, ICBR2017, 27 – 29 November 2017, Bangkok, Thailand

Obstacles and Benefits in implementation of Gold, Silver, and Bronze (GSB) Model in Emergency Response in the UAE

Saif Alawadhi [a]*, Chika Udeaja [b]

[a]Centre for Disaster Resilience, School of the Built Environment, University of Salford, Salford, M5 4WT, UK
[b]Programme Director Construction Project Management, School of the Built Environment, University of Salford, Salford, M5 4WT, UK

Abstract

The United Arab Emirates (UAE) is vulnerable to natural disasters such as earthquakes, floods, and tsunamis. Emergency response and incident command model have been implemented to help mitigate against these hazards in various part of the world. More recently, the Gold, Silver, and Bronze (GSB) model of incident command has been adopted in the UAE to integrate joint efforts, to control over emergency response and incident management at the local, regional and the national levels. The GSB model was originally established in the UK to organize efforts for quick control on incidents and has since been adopted by the UAE. In the UAE context, the GSB model provides commanders with clear responsibilities during emergencies and facilitates coordination between the commanders and partners towards achieving its desired benefits. The study deploys a case study research strategy, qualitative exploratory research design as a methodological choice to understand the current GSB obstacles and benefits in the context of the UAE's Civil Defense General Command (CDGC). Thematic and content analysis is used to analyse the semi-structured interviews with senior commanders. Despite having applied the GSB model successfully, the qualitative findings demonstrate the CDGC has faced many obstacles related to it is efficiency in responding incidents. In contrast, the GSB model has defined the roles and responsibilities of commanders during incidents and thus organized the incident response procedures in a way that each commander achieves.

* Corresponding author. Tel.: +971506272121
E-mail address: s.a.m.a.alawadhi@edu.salford.ac.uk OR s401@hotmail.com

1. Introduction

The number of disasters worldwide has grown to a significant extent [1]. According to UN/ISDR [2] during the past two decades, 200 million people annually, on average, have been affected by disasters. Although an increased awareness of the importance of disaster response, capacities of response organisations in developing countries continue to experience obstacles. The severity of damage caused by disasters is also correspondingly larger in developing countries that have less capacity to build and maintain response capabilities [3]. These countries could benefit from the experience of developed countries that have been through periods when insufficient training, lack of resources and organisational preparedness for such occurrences eventually led the responsible authorities to develop more effective response models to manage emergencies. This development was fed by the past experience of the significant negative impact that disasters and emergencies can have on individuals and their communities and the massive destruction they cause to a region [4]. The demands of forwarding planning are complicated by the unique nature of each emergency; most emergencies are unexpected and unpredictable regarding time and location [5]. This uncertainty and complexity emphasise the need for emergency agencies to respond effectively to minimise the impact [6].

Accordingly, efforts have been made by organisations like the Cabinet Office in the UK to develop command models that can build response capacity. The United Kingdom's Civil Contingencies Act 2004 introduced the Gold, Silver, and Bronze (GSB) command response model to deal with emergencies [7, 8]. GSB structure was developed for holding responsibilities in the coordination of command and control efforts [9]. This model includes a guide to roles and responsibilities to cope with any events that might cause a hazard. It is flexible enough to be adopted even by local emergency services, which include fire-fighting agencies and the police force as well as others [10]. The aim of command structure is to enhance communication and to reduce confusion between emergency commanders to gain more effective incident management [11]. Lessons can be learnt from developed countries that have effective response structures that can help identify problems during a response to emergencies. In the UAE, there is a need to know how their emergency services can adapt and implement emergency response models to reduce the loss of life and damages during emergencies, and to reduce the overall impact on communities.

As a result, there are two primary objectives of this research, first to provide an overview of the GSB model structure, and will look at the experience of the UAE in adopting the UK's GSB model. Second addressing the benefits of using the model as well as some of the obstacles that commanders in the CDGC might be facing in using the model.

2. A brief on Gold, Silver, and Bronze (GSB) Levels of Command

Three are three main levels to structure the command and control in a single agency level. It is possible that the need for responding depends on the scale of an incident, however in general three levels are Gold, Silver and Bronze (GSB) will commonly implemented and take place [12]. It is a basic model for cooperation and managing the leadership during emergencies [13-15]. Although regional tier will provide coordination and facilitation, the actual response to emergencies will remain at local tires at most part such as 'Blue Light' services police, fire, and ambulance [16]. According to Kusumasari, Alam [17] there is a global understanding that local agency plays a major role in emergency response operations because most local governments rely on the command and control model to respond to an emergency.

The terms GSB is three common structure of command which has been used in response to emergencies as alternatives military levels of command [18], each level of them has responsibility for strategy, tactical and operational activities. As it was mentioned these levels of command are used across the UK for all large scale of emergencies, and agencies are familiar with all roles and responsibilities within three levels of command [19]. The strategic is the level where the decision is made it is a boundary phase between the emergency response agency and the main organisation of government, which are responsible for providing resources and logistics. The tactical is the level where have responsibilities to allocate resources. The last tier is operational, which deals immediately and directly with responding to the emergency [20].

There have been several studies in the literature reporting on the importance of the GSB model. For instance, the GSB model can help commanders to make a right decision during an emergency [21], it enhances a flexible exchange

of information, and all members are informed by regular briefings [22]. A good command model relies on sharing responsibilities, and the commander should ensure that all emergency participants are aware of their roles during response operations [20]. However, on the negative side, there are some significant barriers to effective implementation of the GSB model. Command ability is a key factor to manage an emergency, as commanders are expected to remain calm under pressure and be confident in time management [23]. A lack of understanding the model as a process between all participants could lead to a failure in emergency response [21].

3. Research Methodology

This research is a qualitative research design in nature. Qualitative research involves expressing reality by observing people in natural situations [24]. It seeks to understand the feelings and realities of a situation by investigating the 'what' [25]. Many reasons for choosing this type of research design. Firstly, based on the main aim of this research which is to explore the emergency response standards and elements of the application of GSB incident model, the qualitative design suites this research more as the qualitative data will aid in exploring a phenomenon in depth. Secondly, this design is presumed to help the researcher gain a comprehensive understanding of how the response to emergencies can be managed by the emergency services, by conducting semi-structured interviews with high-level senior incident commanders. Therefore, this research adopts the case study strategy design, because a researcher who is interested in a case study design as a strategic method is usually focused on exploring a particular phenomenon, which he hopes to understand in significant detail [26].

Regarding data analysis, this research adopts a deductive approach. The deductive approach helps researchers draw links between research on different subject areas, such as content analysis and thematic analysis, [27, 28]. Content analysis is one of the most famous approaches for analyzing qualitative data [27]. According to [29], content analysis is a technique used to analyze text data by understanding and analyzing it by categorizing themes defined. Furthermore, thematic analysis/ template analysis [30] involves pattern and themes identification which codes and organize a set of data in more details for further analysis. According to [31] the semi-structured interviews questions may be a good basis for identifying themes. Those themes are the main categories and eventually become the basis of the research findings. Each theme has a sub-themes that can be developed, and codes refer to the name of the themes.

This approach is used to analyze the qualitative data by making a transcript of each semi-structured interview [32]. In this study, content and thematic analysis will be used to analyze the semi-structured interviews with senior gold and silver commanders using the NVivo software version 10 [33]. Based on the above discussion, in this research, the qualitative data from interviews were coded using predefined codes based on the interview script, following the structure of two sections as follows: obstacles and benefits of GSB model implementation in the UAE.

4. GSB Model Obstacles in the UAE

All participants were asked about what they perceived to be the reasons for failures in the GSB model implementation, and the major obstacle to a successful implementation. The responses provided to this question were coded in six main codes. These four themes are summarized in Table 1, including the most relevant codes and the number of participants, by level, mentioning each theme.

Table 1. Reasons of failures and obstacles: Emerging themes and select related codes.

Themes and related codes	Gold (n=7)	Silver (n=7)	Total
Lack of Knowledge	5	5	10
Issues with Qualifications	4	5	9
Lack of Training	4	5	9
GSB is New	2	1	3

4.1. Lack of Knowledge

A first factor most commonly identified as responsible for problems with the implementation of the GSB model was a lack of knowledge by the commanders, which is at times also presented as a lack of complete understanding of the GSB model. Some of the participants identified specific areas in which they thought the lack of knowledge was an issue, the main reported on being roles and responsibilities. In one case a commander referred to stakeholders' lack of knowledge as a concern. Some participants indicated that this issue was in part the result of the GSB model still being new.

Various interviewees who identified lack of knowledge as a challenge did so without providing much detail. For instance, sliver participant simply identified it as the most common reason for the failure of the model, *"The failure of the GSB model is usually attributed to lack of knowledge."*

In the case of the gold interviewee, he worded his concern about the lack of knowledge in the positive, by expressing the importance of a complete understanding of the model in order to achieve success, *"Understanding the GSB model is crucial for its success and vice versa."*

For the most part, interviewees clarified that it was specifically commanders' lack of knowledge that negatively impacted a successful implementation of the model. Some interviewees expressed that the model fails when commanders lack knowledge, with gold interviewee also providing a positive assessment of how when knowledge is present, commanders can lead the model towards success, *"We have suffered the failure of the model sometimes because some commanders do not have the knowledge to operate the model."*

Therefore, the model fails when the commanding leader of the model fails. Indeed, knowledgeable and highly skilled commanders can lead the model effectively towards success. In summary, lack of knowledge, particularly by commanders regarding their roles and responsibilities within the GSB model, was identified as the main limitation to the model's continuity.

4.2. Issues with Qualifications

A total of nine participants (n=9) made reference to possible issues with commanders' qualifications. In some cases they mentioned general concerns or limitations in this regard, referencing the difficulties of training commanders so that they would gain the necessary qualifications. Some interviewees specifically indicated to obstacles due to lack of experience or lack of decision-making abilities by commanders. For instance, one participant made particular emphasised the importance of guaranteeing that all employees acquired the required academic qualifications. According to him, it would be upon the CDGC to ensure that this education is provided to all employees as needed, *"Employees in the CDGC should be trained on the GSB so as to be effectively implemented and applied. In this vein, the academic qualification is necessary for all employees. The CDGC Academy should take the lead to educate staff on operations through specialised courses" S01.*

Eight participants identified lack of experience as a limitation in terms of commanders' qualifications. For instance, S03's quote is illustrative of what and how participants indicated this, *"He may be lacking knowledge or experience or even lacking experience" S03.* Another level on which interviewees alluded to issues with commanders' qualifications was on decision-making, with three of them considering that there is either an inability to take decisions.

Some participants mentioned concerns with commanders' qualifications, particularly in terms of lack of experience and problems with decision-making. There was also a concern regarding the amount of time and commitment that is required to raise these qualifications

4.3. Lack of Training

Related to the aforementioned concern with commanders' qualifications, another important factor identified by participants as challenging was that of lack of training. According to nine participants, this was a major concern and an aspect where they perceive the model remains weak. Training is perceived as important for sustainability, and as something that needs to occur on a regular basis but doesn't. The comments expressed by G07 and S01 are illustrative of how commanders presented training as a weakness and challenge, and a factor that is required for a successful adoption of the GSB model, *"One major change to face the adopting and implementing GSB model is a lack of training." G07. "In my opinion, the weakness of the model lies in: the lack of commanders' training" S01.*

Furthermore, G03 provided some more detail, as he explained how the expertise built through training, which is limited, is essential for sustainability but takes a long time, *"GSB model reinforcement is strongly needed for the sustainability of the model because the expertise selected for the implementation of the model is limited. Indeed, new commanders need training, which is lacking" G03*.

In the same vein, S05 underscored that training needs to occur on a regular basis in order for commanders to gain adequate awareness of the GSB model, *"The weaknesses of the GSB model are represented by the lack of training. Training should be established on scheduled bases so as to increase the commanders' awareness of the model" S05*.

In short, training is perceived as weak and not adequate for successful implementation of the GSB model.

4.4. GSB is New

Three participants identified the GSB model's newness as a factor that explains a number of the obstacles being faced in the implementation and continuity. So is the account of G02: *"There are some obstacles to work or model application due to that the model is still new" G02*.

S01 offered a similar assertion, further clarifying that in time potential solutions will need to be offered, with obstacles and solutions being circulated by the CDGC, *"There are challenges at work or model application. Implementing and applying the model are two significant challenges since the concept is still new. The CDGC should circulate the challenges to it is staff and work to solve the potential problems and circulate the solutions over the staff" S01*.

Overall, the possible ways of eliminating or minimising challenges suggested by participants in these interviews were in direct response to the multiple sources of failures that they had already identified. With the lack of training, exercising, knowledge, and experience, the GSB model is new being the main obstacles identified in the model implementation, an improvement in these areas were not surprisingly presented as the best paths for minimising obstacles.

5. GSB Advantages and Benefits in the UAE

Results on interviewees' answers to the question of what are the main advantages and benefits of the GSB model are presented in this chapter. For the analysis, participants' responses were coded with the final codes presented table 2. Five main themes were identified.

Table 2. Advantages and benefits: Emerging themes and related codes.

Themes and related codes	Gold (n=7)	Silver (n=7)	Total
Clear Roles and Responsibilities	6	6	12
Clarity in Command Structure	3	3	6
Communication and Information Sharing	3	3	6
Assure safety and avoid committing errors	1	3	4
Coordination	3	1	4

5.1. Clear Roles and Responsibilities

The GSB model benefit most commonly identified by participants was the definition of roles and responsibilities of all actors involved; most participants recognized this as one of the main benefits. This was expressed in various ways. Twelve interviewees mentioned this advantage. Participants expressed this succinctly, stating the definition of these roles and responsibilities, and commanders' knowledge of them, as a key for success. Such as the case of S05, *"The GSB is successful simply because it specified all roles and responsibilities" S05*. In the case of G07, he additionally specified that this definition of roles and responsibilities also includes those of stakeholders, *"The model has defined the roles of all stakeholders and commanders participating in the emergency response process" G07*.

5.2. Clarity in Command Structure

Six participants referred to the clarity in the command structure as an important benefit of the GSB model. This includes the explaining of the order structure among commanders and the provision of an organized framework within which they operate. G03 explained this benefit as the result of the model organizing how commanders work, and the structure among them, *"Above all, the model has organized the way commanders do their work and explained the order structure declared among commanders"* G03. Furthermore, G07 goes as far as to refer to this clarity in the command structure as one of the most important features of the GSB model, *"Clarity, structured calls for support, and command structure were the most important features of the model"* G07.

One other benefit is that the GSB model defined the commanders. However, previously, commanders involved in emergency response were not defined. Hence, the strategic benefits from the deployment of GSB is that they organize the incident management process, how to distribute efforts, how to use facilities and the tools that can be professionally used in the incident.

5.3. Communication and Information Sharing

A third benefit, identified by six interviewees, was the improvement of communication and information sharing between commanders. According to S05, the GSB model facilitated communication, *"Facilitated the communication and cooperation at the command levels"* S05. For G01, this benefit was considered as the use of effective communication, *"The usefulness of the system stems from setting plans, use effective communication"* G01.

In the case of S03 and G06, they phrased this advantage of the model in terms of supporting what they called "easy communication" by and between commanders, *"The model has many advantages such as easy communication by commanders"* G06. *"Easy communication process between the commanders and the ease of conveying information between commanders"* S03.

Providing one of the most detailed presentations of this advantage is that after the implementation of the GSB model communication was timely, allowing for the proper flow of information. Information was transmitted and conveyed in time between the three levels of commanders. Most interestingly, the model is effective in command and control, transmit and flow of information.

5.4. Assure safety and avoid committing errors

Also, a benefit for GSB model implementation, minimizing the risk during emergency response was also one of the benefits identified by participants (n=4). This was mostly expressed as providing better safety tools to emergency response actors, as exemplified by interviewees. These commanders understand that these tools can minimize risks and errors, thus saving lives by having all actors operating in a safe way. S02 reported: *"The first benefits and outcome of this application is saving the lives of work teams. The CD type of work is associated with mutable risks, and the lack of commitment to GSB exposes the lives of people to major risks. Thus, the primary aim of this model is to save of minimizing the losses of lives"* S02. Hence, by having better clarity in procedures and putting in place elements like easy identification of officers during emergencies, GSB supports the safety of employees and the better accomplishment of personal protection tasks.

5.5. Coordination

Three participants (n=3) were the ones to identify better coordination as a benefit of the GSB model. G01 explained this in detail, by indicating how different systems and subsystems and elements of incident response are linked together, *"The involvement of commanders and the intervention of the leadership at every stage are done to link the basic systems of command and control. The usefulness of the system stems from setting plans, use effective communication systems, support coordination, decision making, risk analysis, and all these things are linked together with the incident management and therefore must be improved altogether"* G01.

The aspect in which clarity was recognized as a direct result of GSB was permitting better communication and coordination. Furthermore, the benefits of the application of GSB enables managers to know and understand the extent and quality implementation of the GSB model. Accordingly, the GSB tools is designed to accelerate incident

management procedures and foster communication and coordination between all partners in combating hazards.

6. Conclusion

From this research, it can be seen that the obstacles participants identified from the model differ. Most of the references were about the lack of knowledge, expertise, and training, particularly among commanders. Problems in compliance of the model were also significant, with some participants stressing how some commanders refused to accept and implement the model, which led to conflicts in command. Concerns about the lack of commanders' qualification to manage incidents, and having a poor evaluation of commanders' skills, as well as the model implementation in general, were also main obstacles.

The perceived advantages and benefits of the GSB model were presented. Once again, clear definitions of roles and responsibilities were the main issues, which provide more clarity in the command structure. Communication and information sharing also were found as improvements. Overall, participants considered that the GSB model facilitated incident management and decision-making, which resulted in improved outcomes and performance. Furthermore, participants' comments on how the new GSB model compares with the old model. The responses on both of these were overwhelmingly positive, with a marked improvement over the perceived lack of order that existed before being noted. For the most part, participants considered that the GSB model had indeed achieved its goals.

Acknowledgements

References

1. Xu, W. and S. Zlatanova, *Ontologies for Disaster Management Response*. Geomatics Solutions for Disaster Management, 2007: p. 185-200.
2. UN/ISDR, *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters*, in *World Conference on Disaster Reduction 18-22 January 2005, Kobe, Hyogo*. 2005: Japan.
3. Guha-Sapir, D., P. Hoyois, and R. Below, *Annual disaster statistical review 2014 The numbers and trends*, in *Centre for Research on the Epidemiology of Disasters (CRED)*. 2014, Université catholique de Louvain – Brussels, Belgium.
4. Frankenberg, E. and D. Thomas, *The Demography of Disasters*. 2014.
5. Alexander, D., *Towards the development of a standard in emergency planning*. Disaster Prevention and Management, 2005. **14**(2): p. 158-175.
6. Smith, D. and M. Fischbacher, *The changing nature of risk and risk management: The challenge of borders, uncertainty and resilience*. Risk management, 2009: p. 1-12.
7. Cabinet Office, *Civil Contingencies Act 2004: a short guide (revised)*, C.C. Secretariat, Editor. 2004: London.
8. Mishra, J., D. Allen, and A. Pearman, *Understanding decision making during emergencies: a key contributor to resilience*. EURO Journal on Decision Processes, 2015. **3**(3): p. 397-424.
9. Kahn, L. and J. Barondess, *Preparing for Disaster: Response Matrices in the USA and UK*. Journal of Urban Health, 2008. **85**(6): p. 910-22.
10. Cabinet Office, *Emergency Response and Recovery Non statutory guidance accompanying the Civil Contingencies Act 2004*, C. Office, Editor. 2013, Crown London.
11. Crichton, M. and R. Flin, *Command Decision Making*, in *Incident Command: Tales from the Hot Seat*, R.H. Flin and K. Arbuthnot, Editors. 2002, Ashgate Publishing Limited: United Kingdom. p. 201-238.
12. Cabinet Office, *Responding To Emergencies The Uk Central Government Response Concept Of Operations*, C. Office, Editor. 2013: London.
13. Groenendaal, J., I. Helsloot, and A. Scholtens, *A Critical Examination of the Assumptions Regarding Centralized Coordination in Large-Scale Emergency Situations*. Journal of Homeland Security and Emergency Management, 2013. **10**(1): p. 113-135.
14. Ramchurn, S.D., et al. *Hac-er: a disaster response system based on human-agent collectives*. in *Proceedings of the 2015 International Conference on Autonomous Agents and Multiagent Systems*. 2015. International Foundation for Autonomous Agents and Multiagent Systems.
15. Fors, F., et al. *Shaken, not stunned: The London Bombings of July 2005*. in *Critical Intelligence, Communication and Response vid CIAG, University of Virginia*. 2006.
16. O'Brien, G. and P. Read, *Future UK emergency management: new wine, old skin?* Disaster Prevention and Management: An International Journal, 2005. **14**(3): p. 353-361.
17. Kusumasari, B., Q. Alam, and K. Siddiqui, *Resource capability for local government in managing disaster*. Disaster Prevention and Management: An International Journal, 2010. **19**(4): p. 438-451.

18. Ministry of Defence, *Operations In The Uk: The Defence Contribution To Resilience* 2007, Joint Doctrine Publication 02 The Development, Concepts and Doctrine Centre, Ministry of Defence, Shrivenham.
19. Eyerman, J. and K. Strom, *Multiagency Coordination and Response: Case Study of the July 2005 London Bombings1.* International Journal of Comparative and Applied Criminal Justice, 2008. **32**(1): p. 89-109.
20. Alexander, D., *Emergency command systems and major earthquake disasters.* Journal of Seismology and Earthquake Engineering, 2008. **10**(3): p. 137-146.
21. Chlimintza, E.M. *Resource management in fire fighting organizations: lessons from the Buncefield oil depot fire and the Greek 2007 Forest Fires*. in *the 12th Biennial Conference of the International Association for the Study of Commons, Governing Shared Resources: Connecting Local Experience to Global Challenges, Cheltenham, July*. 2008.
22. Kirrage, D., et al., *Lessons learned from handling a large rural outbreak of Legionnaires' disease: Hereford, UK 2003.* Respiratory medicine, 2007. **101**(8): p. 1645-1651.
23. Flin, R. and G. Slaven, *Personality and emergency command ability.* Disaster Prevention and Management, 1996. **5**(1): p. 40-46.
24. Amaratunga, D., et al., *Quantitative and qualitative research in the built environment: application of "mixed" research approach.* Work study, 2002. **51**(1): p. 17-31.
25. Rajasekar, S., P. Philominathan, and V. Chinnathambi, *Research Methodology.* arXiv preprint physics/0601009, 2006.
26. Dooley, L.M., *Case study research and theory building.* Advances in developing human resources, 2002. **4**(3): p. 335-354.
27. Gray, D.E., *Doing Research In The Real World*. Third ed. 2014, Third Edition, London: SAGE Publications Ltd.
28. Saunders, M., P. Lewis, and A. Thornhill, *Research Methods for Business Students*. Fifth edition ed. 2009, Fifth Edition, United Kingdom: Pearson Education Limited.
29. Stemler, S., *An overview of content analysis.* Practical assessment, research & evaluation, 2001. **7**(17): p. 137-146.
30. Easterby-Smith, M., R. Thorpe, and P. Jackson, *Management and Business Research*. 2015, Fifth Edition: SAGE.
31. Rowley, J., *Conducting research interviews.* Management Research Review, 2012. **35**(3/4): p. 260-271.
32. Saunders, M., P. Lewis, and A. Thornhill, *Research Methods for Business Students*. 7th ed. ed. 2016, Seven Edition, United Kingdom: Pearson Education Limited.
33. Bazeley, P. and K. Jackson, *Qualitative data analysis with NVivo*. 2013: Second Edition, Sage Publications Limited.