

THE PRE- AND POST PHASES OF TRAINING SESSIONS RELATED TO MAJOR EMERGENCIES.

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ABSTRACT:

Most training sessions are concentrated on the practical realisation of the session, e.i. running a scenario in which a series of accidental events are selected and being executed in a more or less fixed sequence. Based on the scenario the trainees will experience a highly stressing, yet reasonable plausible situation in order to test and train their ability to take rational decisions trying to minimise the consequences of the accidental situation. The session is normally followed by a debriefing, in which the responsible of the training session in rather brief terms is commenting the occurrence of the session and stressing his notations and evaluation of actions taken by the trainees.

However, even though the execution phase of the training session is of utmost importance, the efficiency of a training session is strongly dependent on the pre-phase - the phase of planning - in which the objectives of the training session have been made completely clear, and the debriefing and evaluation phase, which in fact is the most teaching phase of the training session if planned and accomplished in a proper way.

This goes for most kinds of training sessions; however, in this paper we will deal mainly with problems related to tactical training associated with management of major emergencies; and methods and tools applied in the training module of MEMbrain (Major Emergency Management) called the MUSTER training programme (Multi-User System for Training and Evaluation of environmental emergency Response) will be outlined.

INTRODUCTION

Even though several effective emergency management decision support systems are being developed in order to increase the efficiency and diminish the risk of bad solutions related to emergency management, training relevant for emergency management always has been and always will be of utmost importance for having a good preparedness assuring optimal performance in crisis situations.

Training of personnel coping with emergency management must be accomplished at all levels: the level related to the skill of individuals coping with practical duties, the level related to the efficiency of groups of individuals, and the highest level concerning tactical decisions about the most efficient way of handling the emergency situation.

The two first of these levels are taken care of by field exercises conducted by the sub-organisations of the complete preparedness organisation, and these levels are not the goal of MUSTER¹⁾ training. The top level, however, concerning the co-ordination of efforts among the decision makers of the preparedness organisation are not frequently trained due to the need and difficulties of including all parts of the organisation.

Most training sessions have their main efforts allocated to the "real" training phase, the execution of the training session, and often a lot of consideration is laid on technical issues like the number of telephones or other kinds of communication means, the number of vehicles available, e.g. fire trucks, police cars and ambulances, and even the number of blankets and other kinds of necessary equipment.

All these aspects are of utmost importance as the lack of resources may be the reason for the lack of success during any emergency response in real life as well as in training set-ups. However, in major emergency situations these kind of problems are normally not the ones causing lack of optimal performance; but the problems in coping effectively with an emergency situation are related with lack in tactical planning and execution at a high level, due to the fact - as mentioned above - that decision makers at the high level do not have the same possibility to train their performance, as this involves interactive fulfilment of tasks including co-operative efforts among all parties of the complete emergency organisation; and this is difficult to arrange as it includes the participation of normally busy high rank officers, and it is expensive and time consuming.

Therefore, in order to obtain the optimal benefit from the training investments, it is extremely important to plan and prepare the training sessions very carefully, and to utilise the lessons learned to the utmost, i.e. the phases before and after the real training session may be at least as important as the training session itself. This statement is often neglected or of other reasons violated when setting up and execution of a training session is accomplished.

THE TRAINING PRE-PHASE

A number of aspects must be clarified in advance of the detailed planning of a training session in order to benefit as much as possible from the resources invested, be they financial, technical or personnel:

- the training objectives
 - who is to be trained,
 - what is to be trained,
- the reasons for the training
 - why should the training take place,
 - when should the training take place,

- the methods of training
 - who will be in charge of the planning and the execution of the training,
 - what kind of equipment and resources are available for the training,
 - what kind of training environments will be used,
- the evaluation of the training
 - evaluation of the occurrence of the training session,
 - evaluation of the outcome of the training.

The choice of scenario should reflect the category of trainees and their needs of improved performance in real life situations due to the fact that the handling of accidental events during a real accident is depending on decisions learned and taken by the persons represented by the trainees. Furthermore, the decisions to be taken should reflect if the training is focused on the trainee as a supreme emergency manager, or if the training is focused on training of the co-operative performance in emergency management, i.e. as individual or organisational emergency management training. In fact, the experience obtained especially within the aviation safety - but spreading to other domains like the maritime - is that safety in critical situations is highly improved by training the "Crew Resource Management"²⁾, CRM, i.e. emphasising the co-operative performance of the group of decision makers in a critical situation instead of putting focus on the commander in charge as the superior decision maker, even though he finally will be the main responsible of the emergency management performance.

The "why should the training take place" is very often related with the "what to be trained", due to the fact that the "why" is often connected to the occurrence of a recent real life accident not coped with in the most optimal way. A post mortem analysis of the accidental situation may unveil the reasons for the non optimal performance, and this will often be the input for a succeeding training session in order to improve the future performance in similar situations.

Likewise, the time of training sessions will often be closely related to the time of real life critical situations, as the potential trainees as well as persons responsible for the efficiency of the preparedness - and therefore often for the status of training - are highly motivated for any action that may improve the future performance.

On the other hand, regular training sessions meant for training of novices, or meant for maintaining the necessary skill of experts for possible future actions will have a more broad scope, and the scenario for such training sessions will often be more standardised with minor updating based on a variety of recent accidental situations coming to the mind of the supervisor planning and preparing the training session.

Furthermore, in planning a training scenario the supervisor must take into consideration the environment in which the training scenario will take place, reflecting the fidelity or realism of the training settings. These may range from a field exercise in which the environment and the resources are normally the same as those involved in a real emergency situation, to a simulated environment either in form of a "Lego-table set-up" often used in the military or build by computer simulations using virtual reality or still pictures as used in training environments represented by the MUSTER system, or finally, the environments may just be like in a table

top exercise with the trainees placed around a table with, e.g., drawings of the threatened environments. Furthermore, the supervisor must consider the equipment available to the trainees during the execution of the training session, in order not to specify actions that need equipment normally available in a real life situation, but non existing in the training environments.

Likewise, the context in which the training session will take place must be considered during the planning, e.g. which organisations are involved in the training session and which ones are played as roles by the supervisor and his aides in order to give the trainees the impression that everyone they would inquire, order or in other ways correspond with in a real life situation could be approached also in the training situation.

In fact, no matter the motives of the specific training session, it is important to make clear already during the planning phase the objectives of the training and how to evaluate the occurrence of the training session in order to learn how to run a scenario smoothly and on the lines of interest of the training objectives; and even more to evaluate the training outcome of the session, i.e. to define the success criteria: what is expected to be improved during the training session, and how is it verified that this improvement has in fact taken place.

However, when using a training environment like MUSTER, one should realise that this type of system will be usable for much more than mere training.

Running a scenario in which it has been assured that all emergency management procedures are well-known to the trainees and carried out in correct order in accordance with the accidental events coming up, it will be possible to try out these procedures to test their validity; or one may try out the efficiency of the emergency managing support systems or the availability of resources needed for coping with a given emergency situation.

Therefore, objectives of "running" a MUSTER system may - besides the training aspects - just as well be a testing of existing systems supporting emergency management or even more, a testing and evaluation of new emergency coping support systems, e.g. new set-ups of emergency management decision support systems.

The support given by the MUSTER system for the planning phase is - besides stressing the points mentioned above of being well aware of objectives, reasons, methods, etc. - a tool for the supervisor or training session planner for setting up an event-tree specifying a variety of possibilities of events and sequences of events selected by the supervisor on basis of the objectives of the training session³⁾.

For this process the MUSTER system is equipped with two data-bases: one in which previous scenarios that may be used directly or modified as the kernel for new scenarios have been stored; and one containing a number of standardised or specific events to be used as building stones for new scenarios.

Having selected a set of single or sequenced events of relevance for the training scenario the supervisor wants to create, he may link and schedule these events into an event tree - as shown schematically in figure 1 - that may support his overview of the scenario during the

planning phase, and - even more - support the execution of the scenario during the training session.

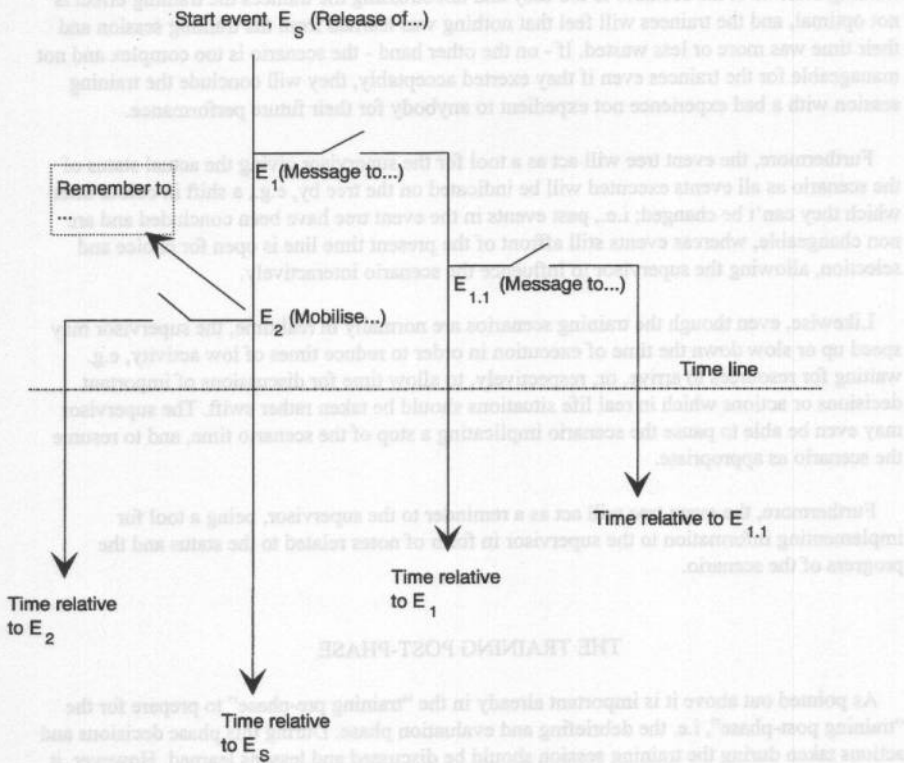


Figure 1: Event tree

Each event in the event tree may - based on the wish and choice of the supervisor - be executed automatically at the time specified by the supervisor during the planning phase, or he may be prompted - if he wishes so - by the system during the execution, and interactively decide to "fire" the event, cancel it or postpone it for later action. A selected event will be shown by a closed "valve" in the event tree, and the actual full scenario is given by the closed event lines crossing the time line indicating the actual scenario time.

Each branching point in the event tree specifies a point of choice taken either by the supervisor in order to guide the scenario along lines most suitable for the objectives of the actual training session, or by the trainees reflecting their actions when coping with the emergency situation. The choice of the supervisor is even more a tool by which he will be able to stress or facilitate the scenario depending of the ability of the trainees to cope effectively with the accidental situation.

An appropriate stressing of the scenario is important in order to benefit the most from the training session. If the scenario is too easy and not stressing the trainees the training effect is not optimal, and the trainees will feel that nothing was learned from the training session and their time was more or less wasted. If - on the other hand - the scenario is too complex and not manageable for the trainees even if they exerted acceptably, they will conclude the training session with a bad experience not expedient to anybody for their future performance.

Furthermore, the event tree will act as a tool for the supervisor giving the actual status of the scenario as all events executed will be indicated on the tree by, e.g., a shift in colour after which they can't be changed; i.e., past events in the event tree have been concluded and are non changeable, whereas events still affront of the present time line is open for choice and selection, allowing the supervisor to influence the scenario interactively.

Likewise, even though the training scenarios are normally in real time, the supervisor may speed up or slow down the time of execution in order to reduce times of low activity, e.g. waiting for resources to arrive, or, respectively, to allow time for discussions of important decisions or actions which in real life situations should be taken rather swift. The supervisor may even be able to pause the scenario implicating a stop of the scenario time, and to resume the scenario as appropriate.

Furthermore, the event tree will act as a reminder to the supervisor, being a tool for implementing information to the supervisor in form of notes related to the status and the progress of the scenario.

THE TRAINING POST-PHASE

As pointed out above it is important already in the "training pre-phase" to prepare for the "training post-phase", i.e. the debriefing and evaluation phase. During this phase decisions and actions taken during the training session should be discussed and lessons learned. However, it is important in order to benefit the most from this phase that the objectives of the training session, e.g. what should be trained and improved, and the criteria of success have been defined.

Likewise, during the execution of the training scenario, the debriefing and evaluation phase has been prepared by a detailed logging of all events and actions taken during the fictitious emergency. So, specific actions selected by the supervisor may be the basis of discussion of the emergency management performed by the trainees.

To support this phase of the training session the MUSTER system may be connected to a logging and presentation system called MULTIMO: "Multi-modal technologies for recording and analysing operator behaviour"⁴⁾, see figure 2 in which the set-up is exemplified by an eye mark recorder, a microphone, and some video cameras. This is a tool for recording and logging a variety of parameters describing the performance of the trainees, e.g. video and stereo recordings of attitudes and speech of the trainees as related to signals and alarms of the environments. The actual set-up of MULTIMO for a given training session is given by the

specific needs of the session. In the set-up exemplified in figure 2, operators may - besides their general attitudes - have recorded their eye movements, and possibly their hand movements for perception and activation of control panels.

During the execution of the scenario the supervisor or his aides will select and tag situations that may be of interest for later analysis and discussions, and all - or a selection of the recorded parameters - may be presented synchronously in order to study the immediate reaction of the trainees to various events.

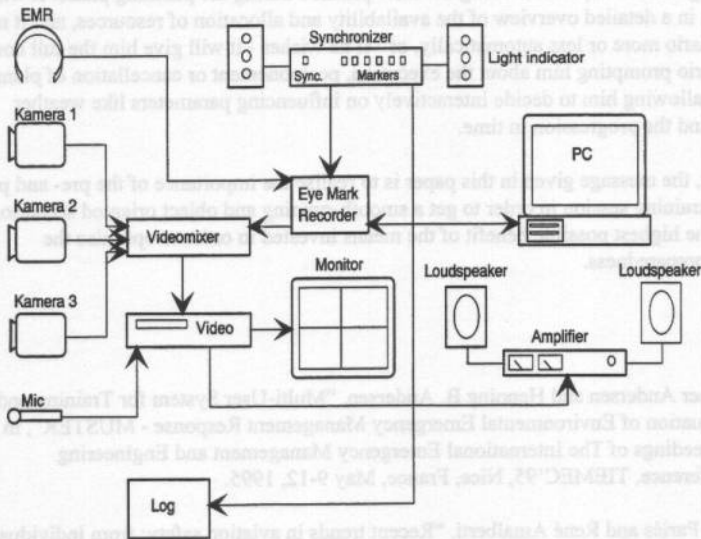


Figure 2: Exemplified set up of the MULTIMO recording system

The efficacy of this system is twofold: First, it may be used in the phase of debriefing, a phase of analysis held among the supervisor and the trainees immediately following the training session in order to discuss the reaction of the trainees during the training session. In the case of training of novices this input may be used by the supervisor for pointing out good or bad behaviour in order to teach the trainees a better performance. However, in the case of training of experts, just having a session for the maintenance or updating of their expertise, the expertise of the trainees may be at the same level as the expertise of the supervisor, and the presentation of selected performance of the trainees during the session may be used as a basis of fruitful discussions of the optimal performance. In fact, a less than optimal behaviour of one of the trainees does not need to be commented by the supervisor; in most cases the trainee themselves will recognise the situation and realise the improvement required. Second, the material collected during the training session may be used for evaluating the emergency managing performance, e.g. in form of analysis of fulfilment and timing of actions taken by

the trainees. Based on this analysis statistics concerning relations between specific behaviour and the beneficial or accidental consequences may be produced.

CONCLUSION

Even though this paper has been dealing with the pre- and post phases of training sessions and the support given by the MUSTER system for these phases, naturally the MUSTER system has, likewise, extensive support for the training execution phase during which the system will guide the supervisor along the lines planned during the planning phase. It will support him in a detailed overview of the availability and allocation of resources, and it may run the scenario more or less automatically, or - if he wishes - it will give him the full control of the scenario prompting him about the execution, postponement or cancellation of planned events, and allowing him to decide interactively on influencing parameters like weather conditions and the progression in time.

However, the message given in this paper is to realise the importance of the pre- and post phases of a training session in order to get a smooth-running and object oriented scenario, and to achieve the highest possible benefit of the means invested in order to optimise the emergency preparedness.

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