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## POLICE, SOLDIER, FIREFIGHTER IN EMERGENCY: DECISION MAKING METHOD IS SPECIAL

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### ABSTRACT

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Security managers, such as police, soldier, firefighter, in many cases face special or emergency situations without any signs in advance. In these cases decision makers are under time pressure and they do not have enough time to make the traditional, analytical based decision making method. Despite the above well-known circumstances during education and trainings managers get information mostly about the theory of traditional decision making processes even if practical trainings obviously focuses on the quick responses as tactical elements. This article deals with firefighting managers, how they make their decisions mainly at tactical level and demonstrates their special decision making method to be able to understand it.

An important element of the activities of security managers or emergency responders is that they cannot or only to a very limited extent can modify the terms of the task, improve them as desired. Despite the differences of environment, indications of the *complexity* of the situation, the possibility of the *radical change* in the given situation, *uncertainty* and *ambiguity* of the information available can be recognized and well identified. Author's study reveals during intervention the most essential but limiting factor is *time*. This provides a framework impossible to burst and a forced drift, a *pressurized channel* for the decision-maker, entangled in which one can no longer break free. The above proves that in certain situations, the multi-criteria, analyzing, evaluating decision-making simply cannot be used or only in a limited manner. However, it can be seen that managers, directors or commanders are many times in situations that they simply cannot elude from their decisions; they should make them in a short time. The functional background of decisions made in a short time, their mechanism different from the conventional one was studied lately, and was given the name *recognition-primed decision* to this special decision procedure.

In the article, author illustrates the limits of the possibilities of analytical decision-making, presents the general operating

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### INTRODUCTION

Security managers, such as police, soldier, firefighter can face special or emergency situation without any pre-sign and even if it was forecasted they can meet the requirements of improvisation making their decision. Despite the wide range of the problems in emergency situations this article focuses on the operational and tactical level of the active intervention where problems converge to

one main problem, which is the quick decision, quick response.

An important element of the activities of security managers or emergency responders is that they cannot or only to a very limited extent can modify the terms of the task, improve them as desired. Despite the differences of environment, indications of the *complexity* of the situation, the possibility of the *radical change* in the given situa-

tion, *uncertainty* and *ambiguity* of the information available can be recognized and well identified. Most of these factors are present; occasionally all of them may be present at a certain level of emergency decisions: including the strategic, operational and tactical levels, but certainly with a different focus or at different times. On strategic and operational level, in general, not only more time is available, but also human and technical resources are at hand more broadly, and decision support instruments as well to reduce uncertainties occurring. All of them stand implicit at the background of the intervention's safety, which is priority during the intervention and also very important and complex question at tactical level [1] [2].

As an example, the extinction of fire in a smaller dwelling house requires the implementation of a completely different, simpler scope of tasks than to control fire in a mid-high building [3] [4] or ensuring the preventive rules [5]. Short term disasters require immediate reaction, however slowly developed climate change gives time to create strategy [6]. In another case, during an action of bank robbery policeman can have time just below a second to decide on using fire arms but the chief (or lawyers) can have months to investigate its legality. Soldiers in security patrol can face fire below seconds or can suffer from terrorist's attack without pre-sign. Above illustrates the limits of the possibilities of analytical based decision-making; because of the limited time there is no chance to make the traditional decision making mechanism. Author's effort supports and completes other works which focuses on the safety of the intervention at tactical levels, others developed it more detailed [7].

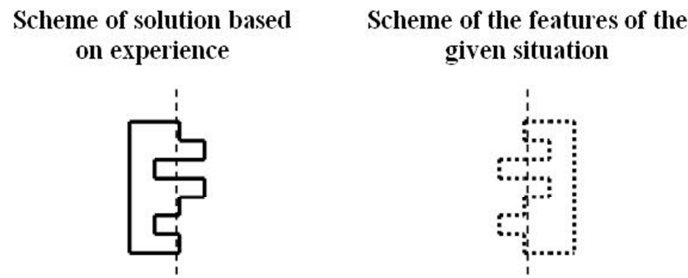
Wide ranges of special literatures were used for lighting the background and complexity of the security managers' problem. Because of the wide range of the problem, topic was tighten and focused on operational and tactical level of decision making. Author took fire managers automatically as example for demonstrating the process of making recognition primed decision. Author used his own field experiment for this article and created also a simple and a complex model for understanding better the mechanism of making decision at tactical level.

## DECISION-MAKING MECHANISM OF A FIREFIGHTING MANAGER

Limited time frame allows the elaboration and management of limited amount of information. We know from Miller's researches that the short-term memory of the vast majority of people can only process simultaneously  $7 \pm 2$  units of information [8]. This information, of course, can be quite different, e.g. characteristics of fire, the capacity of the response unit, a number, or even the absence of information searched. Our memory handles the combinations, "operations" between the information units as information units [9], from which clearly springs forth that the capacity of the short-term memory of a firefighting manager is exhausted very quickly.

Author has proven by essay analysis how complex the tasks of emergency responders are; this shows that in several cases, simultaneously, there is or would be a need to process many more units of information than the capacity of our short-term memory would allow. The maintenance of our decision-making capability, i.e. our short-term memory, based on the above, clearly requires that we should omit analysing and evaluating decision-making processes protracted and use the recognition-primed decision-making procedure, based on previous experience.

Author wishes to create a model element to demonstrate the decision-making mechanism of firefighting managers, which takes into account the limits of the simultaneous processing of information, that is, it also illustrates Miller's decision-making capacity. Since the information units may be qualitatively independent of each other, author chooses the simplest graphical representation of the unit-based discrete difference to separate them from each other. A model element must be able to graphically demonstrate the schemes based on earlier experience, the characteristics of different fires, and the interlocking of the former as the application of the scheme, which represents the technically correct solution of the task, i.e. effective decision. The model refers, at the general model of recognition-primed decisions, mostly to Klein's work [10] [11].



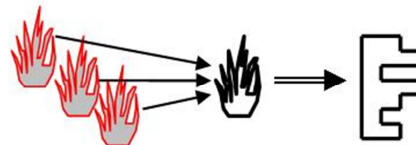
**Figure 1** Graphic representation of the empiric scheme of recognition-primed decisions matching a given situation.  
**Source:** author

The schemes in figure 1 represent 7 *graphical discrete values each*, which are marked by positive or negative protrusions and their “centre line”; these values indicate the amount of simultaneous decision-making capacity. Therefore, the “negatives” of the schemes can be matched as a given situation and the solution necessary. As an integration of above processes, decision mechanism functions as follows: an experienced firefighter has performed the elimination of a large number of different fires. Despite the differing parameters of each fire, some characterizing features can be well conceived (figure 2).

The characterizing features of identical types of fires are crystallized by experience, and are fixed in our long-term memory. Similarly, to the characteristics of a fire, the characteristics of successful extinguishing, the facilitating decisions are also fixed (figure 3); just as the mistakes desired to be avoided and the unsuccessful procedures and failures. Experience gained through many years, based on the features of fires, formulate the system of schemes, behind which we can find actions (decisions) efficiently applicable to eliminate them.

If another incident has almost the same circumstances as one already many times successfully eliminated by an emergency manager previously (model of positive confirmation), he will attempt to use the same ones in the procedures. Therefore, another fire, quasi bearing the typified properties of previous similar fires, a decision-maker involuntarily immediately recalls the typified decisions. The properties of a fire and of previous successful extinguishing operations, based on the

above, are closely interlinked; they are each other’s “reflections” (figures 4). Author proved with the results of association studies that the above, i.e. the characteristics of a fire and the thoughts directed towards its extinguishing, the schemes of response, in the case of firefighters, are very closely connected in a complex way.

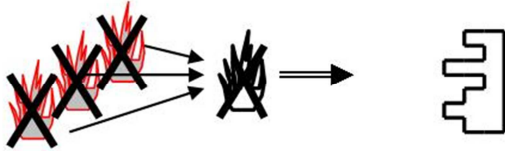


**Figure 2** Evolvement of the scheme on fire.  
**Source:** author

When a firefighting manager identifies a fire, he imagines what would happen if he applied the usual tactics to fight it. If the scheme of solution matches, he accepts it, if not, he rejects it and thinks of the next most typical action. Thus, it is a recognition-primed, model-matching process, which can be followed by a quick and almost automatic decision.

The long-term memory of a firefighting manager, through practical experience, has the schemes of both different fires and their extinguishing characteristics. During another alert, information available and collected on a fire automatically generates the recollection of the scheme necessary to solve it, based on which a firefighting manager defines the firefighting tactics necessary. However, the results of association studies clearly point in the direction that at a given fire (problem) managers do not focus on the fire as a problem but rather on its immediate solution. From this,

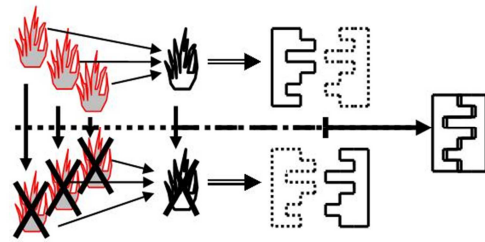
author makes the conclusion that a decision-maker will not follow the change of the characteristics of a fire, but the validity of solution scheme, that is, the dynamics of the implementation of the extinguishing process. This does not mean a contradiction with the previous, but rather a difference in views, the shift of emphasis of the focus of attention.



**Figure 3** Evolution of the scheme on the lessons learnt from extinguishing a fire.  
Source: author

The difference in views, that is, the shift of emphasis means that a firefighting manager does not focus on the change of characteristics of a fire, but rather on the expected evolvement and dynamics of the scheme selected, i.e. extinguishing tactics. Based on the previous, these are, of course, inseparable from each other, however, author finds the dominance of the interventions trend so strong in the results of association studies in the case of firefighters that, based on it, author judges his above conclusion to be justified. The thought sequence *fire-characteristics-solution* is attractively logical, however, the decision capacity of our memory is facilitated if it manages and reduces the necessary information in the simplest possible way. Since the schemes of characteristics relating to a fire exist together with the schemes of solution, there is no real need for it to appear in our short-term memory. Thus, the function appearing is modified to the simplest and shows the format *fire-solution*.

The above do not contradict Klein's model, they rather complement it. Klein, in his model, evaluates (imagines what will happen) the results of matching schemes by the decision-maker prior to performing action version, which, based on author's own experience, is so without doubt, however the aftermath of the decision, in author's opinion, is much more significant in case of firefighting managers.



**Figure 4** Aggregated schemes on fire and the evolvement of the lessons learnt from extinguishing it.  
Source: author

Since the problem immediately and automatically generates both the direction of the solution and start of the action version, rather the process itself is important in terms of efficiency, which is caused by the decision. The schemes based on experience certainly contain the information on the dynamics of the process of fire, so if it meets the expectations, we do not have to modify the original firefighting tactics. However, if the dynamics of the process does not suit the expected, the change is inevitable in the performance of efficiency. Based on the above, the recognition-primed decision is not just an individual act before extinguishing the fire, but it is also the continuous accompaniment as needed. By doing this, author shares the view that the experienced decision-maker perceives the problem together with its solution; furthermore, author extends the continuous co-existence of the problem and of the whole process of solution of an emergency (firefighting and technical rescue).

**MECHANISMS COMPLEMENTING A RECOGNITION-PRIMED DECISION**

Different triggers, internal resources ensure the operation of recognition-primed decisions. Klein, in his work, assumes 5 markedly distinct abilities, these are intuition, imagination, perception of the invisible, the ability to formulate, metaphors and analogies [11]. In the joint work of Cohen, Freeman and Thomson [12], draws the attention to the importance and benefits of critical thinking as criticism of actions planned by ourselves.

Despite the fact that one could assume, based on the previous issues, that recognition-primed decision-making enjoys exclusivity on a tactical level, it is absolutely not true. We can

compare it with several fires or incidents, still, one of the essential features is that it protracts in time. It allows the decision-maker to think over the situation, collect information, develop action versions and consider. Forest fires, peat fires, or in many cases, fires of storage facilities or other hall-type buildings, burning for several hours or days and covering a large area are categorized specifically into the above types. During protracted decision-making, the recognition-primed processes, based on author's experience, proved to be irreplaceable assistance rather in solving partial tasks.

### **ANALYTICAL THINKING**

Killion sees the combination of recognition-primed decision-making with the analyzing and evaluating procedure in two ways [13]. In both cases, the conditions are that adequate time should be available for analyzing the options. In the first case, prior to recognition-primed decisions, focusing on the given circumstances, we set up options and analyze them. In the second case, a more detailed analysis of the action version of our recognition-primed decision may take place. In the latter case, the spectrum of the task is obviously significantly narrower than in the first case. The two mechanisms, depending on the situation, can be harmonized or one of them may become predominant.

The observation of the elemental parts of multi-aspect decision-making shows that decision-makers divide complex problems to smaller and smaller partial problems until they become such a basic level problem that a decision-maker is able to solve even with little effort [14]. This latter process can also be a recognition-primed decision-making, but logically we can find Duggan's view [15], previously referred, at the end of thought list, according to which successful decision-makers not perceive a problem until they can solve it.

### **CRITICAL THINKING ON A TACTICAL LEVEL**

Cohen, Freeman and Wolf studied the possible decision support role of critical thinking on a tactical decision-making level [12]. In their work, active naval officers and case reports were studied based on which they state that experienced emergency decision-makers, in new situations, using their previous experience, make decisions

with help of recognition-primed mechanisms. Cohen's model explains in detail the critical analytical strategies that contribute to the operation of recognition-primed thinking. Systematic situation models often based on informal narratives as schemes organize our information in cause and effect relationship in individual cases and underpin the development of recognition-primed thinking.

One of the most important elements of Cohen's model is the quick test. A quick test is a higher-level control mechanism for critical analysis and its accuracy. Its recognition strategies are formed, similarly to other decision-making processes, by the success or failure experience of past events. The complex recognition mechanism comes to the fore when the demand on time and resources for critical analysis is overweighed. It is possible in three well-definable cases [32]. A quick test considers the conditions in the light of the above factors, and if appropriate, prevents recognition-primed decision, and focuses on critical thinking. When circumstances are not adequate, a quick test will allow for an instant reply. [32].

### **SATISFACTORY PROCEDURE MECHANISM**

We have seen previously that a firefighting manager's time, just as the time of other decision-makers in an emergency to make a decision is limited. Since this time limit precludes the possibility to carry out the necessary analyses of the classic model, objectively the choice of an optimum option is not achievable for a decision-maker. In response to the difficulties of the collection of information and the reduction of the costs in relation, a decision-maker does not strive for optimum results, but, depending on the circumstances, settles for satisfactory solutions.

The above process, different from analytical thinking, is enforced by several factors. Some of these factors are the impossibility of obtaining all information necessary to select the best solution, or the shortage of time; the latter induces a compulsion of decision-making. The limited nature of the processing information available is also of significant influence. Filtering the information, and by this the selection of response to the tasks is necessary because the capacity of our short-term memory is quite limited. According

to Miller's studies, previously referred to, it allows the parallel processing of only  $7 \pm 2$  bits of information at one time [8]. If a firefighting manager made all the basic decisions, his decision-making capacity would be immediately exhausted at a complex firefighting task.

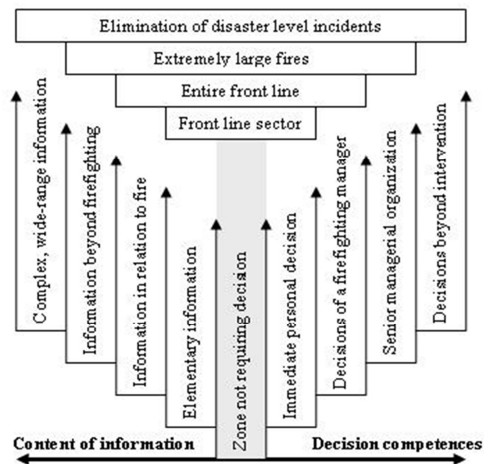
Despite the small capacity, thanks to recognition-primed mechanisms, correct decision is made in most cases (acceptable, given the effectiveness of firefighting). A firefighting manager, using his experience, in situations not requiring decisions different from the previous solutions, implement automatic measures, protocol procedures, thus continuously maintains his decision-making capacity. In this case, using his own experience, a firefighting manager is not interested in the series of best elementary decisions used to eliminate fires, but only in satisfying the conditions of professional firefighting through the decisions made as a whole.

**DECISIONS BY EXCEPTIONS**

The aim of the application of the method is that the leadership responsibilities of managers should be drastically reducible; its essence is that we should only intervene into processes having permanent characteristics in majority, if they cross the pre-specified lower and upper limits. The method, management by sensitive exception, so derived from the dynamics of the processes, the necessary interventions are now possible even before crossing the borders [16]. The method of management by exceptions, based on author's experience, is the greatest help for a firefighting manager to continuously maintain his decision capacity. It can appear in different ways, like protocol procedures, individual way of speaking, silence approval, peripheral vision, and information-processing in zones.

The experience and competence of the persons performing a given activity allows every firefighter to make his basic decisions in his own field of work. This shows the arrangement in zones of information processing (figure 5). Of course, not every incident or moment requires response. This zone does not require action that is practically ignored by a firefighter, because it is a natural consequence of extinguishing. A significant part of problems outside the zone, as a result

of a firefighter's decision in that location, is solved by intervention (firefighting), this information now reaches the firefighting manager, but he usually does not require a decision yet. A firefighting manager manages the problems outside this zone that exceed the decision-making competence of subordinate firefighters. This originates in the fact that, on the one hand, based on the information from reconnaissance and radio traffic, he can create a comprehensive and dynamic picture of the entire process, the evolvement of fire or the efficiency of extinguishing, on the other hand, legislation entitles firefighting managers to take actions.



**Figure 5** Decisions based on exceptions. Source: author

**CREATIVITY**

Creativity has many definitions. Munteanu, in one of his works, presents 35, which approach creativity, in different ways, however, there is no single definition generally accepted or used, either [17]. Analyses researching creativity show that there are three general directions of study [18] [19]. The first concerns the nature of creative thinking, the second one the development of creativity and the third one the characterizing properties of creative people. Amongst the properties, there is practically none, which would not be advantageous for efficient work in a VUCA environment describing the working conditions of a firefighting manager. Based on the above, author made the conclusion that the creative capabilities of a firefighting manager can be explicitly beneficial for facilitating the

technically correct decisions relating to firefighting and technical rescue tasks.

Creativity can significantly increase professional efficiency of decisions made by firefighting managers in unexpected situations. This can be seen when firefighters are able to turn local conditions, in a moment, into exploitable advantages. However, author found that a significant part of properties characterizing innovativeness do not prefer everyday work, free of interventions, in structured organizations, in respect of firefighting managers. This is confirmed by research findings as well, according to which it is explicitly problematic to follow strict rules for people producing creative results (The Reader's Digest Association Ltd., 1992). Maybe this is why it is a typical example that chief fire officers can safely trust the professional firmness of subordinates at incidents, in everyday life, even though the working relationships of managers and subordinates are burdened with tension.

### **HEURISTICS**

Heuristics means that certain distortions are not incidental and unarranged errors, but the results of simplifying mechanisms, with which decision-makers make the complicated tasks manageable for themselves, which cut the Gordian knot [19]. Based on researches related to the names Tversky and Kahneman, we distinguish 5 basic groups of heuristics [20]. These are representativeness, availability, fixing (imprint) and adjustment heuristics, retrospective distortion, as well as overconfidence and calibration. Studying the activities of firefighting managers, there are many examples of practical heuristics.

Overconfidence, based on author's judgement, is one of the greatest risk factors of the efficiency of decisions of a firefighting manager. A firefighting manager, quite often, stops searching for the information necessary earlier than sufficient, based on his experience, he trusts his own judgement, many times, assuming unnecessary risks. The extent of rational risk assumed during interventions should be always chosen proportionately to the given task; a risk assumable at a fire in a grain storage facility can-

not be compared with a fight for the life of a human being.

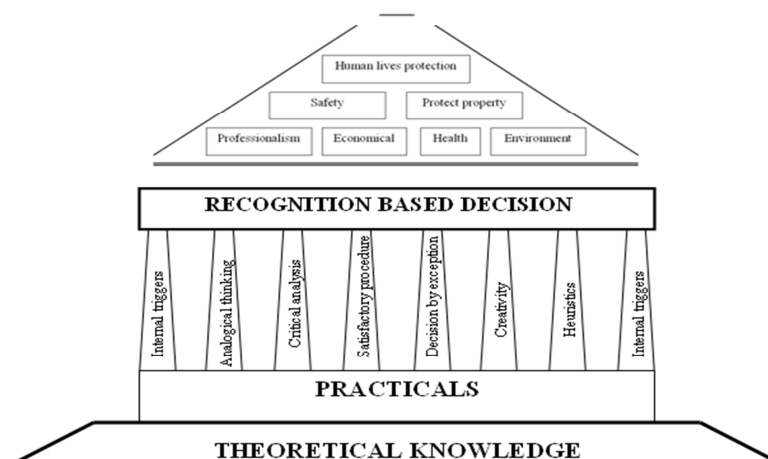
Researches show that overconfidence means that the division between actual and putative knowledge is around 50% [21]. We are best able to judge the certainty of our decisions around 80% of knowledge, over this value, we underestimate our abilities. The above have shown that our actual knowledge does not grow parallel with certainty; the increase of our knowledge does not automatically mean the growth of self-assurance [19]. During firefighting (technical rescue), the characteristic VUCA environment exactly expresses that the actual knowledge of a decision-maker can only be partial, he can only be sure temporarily of the reliability of his knowledge. Aggregating the above, we can see that the risk of overconfidence continuously prevails in the decisions of a firefighting manager.

### **THE COMPLEX MODEL OF DECISION-MAKING IN EMERGENCY**

If not enough time is available for analysing and evaluating decision-making, recognition-primed procedures receive a greater role. Critical thinking uses recognition procedures, during which the decision-making process can be accelerated or analysed with the help of a quick test and depending on the time available. The quick test, considering the circumstances, hinders recognition-primed decision and prefers critical thinking. However, when the circumstances are inappropriate for critical analysing thinking, the quick test allows immediate reply.

Despite the limited decision capacity, thanks to recognition-primed mechanisms, in most of the occasions, correct decisions are made by firefighting managers. Time limit precludes the possibility for the firefighting manager to carry out analyses necessary for the classic model; therefore, the selection of the optimal possibility is objectively not attainable by the decision-maker. The decision-maker is not striving to achieve ideal results, as a response to the difficulties of collecting information and reducing costs in relation, but depending on the circumstances, he is satisfied with its satisfactory solution.





**Figure 6** Complex model of decision-making of firefighting managers in emergencies.

**Source:** author

By reducing the time available for decision-making and for maintaining decision-making capacity, a firefighting manager applies the management (decision-making) method based on exceptions in numerous situations. Its essence is that several moments of interventions proceed protocol-like, thus, they need not be controlled all the time; on the other hand, not all the phases of the processes require direct management decision.

During the study of creativity, author has concluded that there is no feature characteristic of the working circumstances of firefighting managers that would not be advantageous to perform efficient work in a VUCA environment. Therefore, it is sure that the creative capabilities of firefighting managers can be explicitly advantageous to facilitate the professionally correct decisions on firefighting and rescue tasks even if a significant part of the characteristics of innovativeness does not favour the performance of an everyday work free of interventions with respect to firefighting managers.

Heuristics are not random-like errors or specific distortions facilitating our everyday activities. These are the results of simplifying mechanisms, through which decision-makers can make difficult tasks manageable for themselves. Besides the benefits of heuristics, the greatest challenge for a firefighting manager can mean the inherent erroneous distortions, which surely often

help, but their uncritical acceptance, in certain cases, can end up in fatal dangers. The declared objective and sense of the decisions of firefighting managers is the efficient implementation of emergency interventions. It is symbolized by the principles of firefighting with structured division, on the top of which we clearly find the saving of human lives.

Firefighting managers certainly have less time to make their decisions compared to the time interval of classic decisions, so, their decision mechanism is strongly based on recognition procedures due to the peculiar environment (VUCA), and the limited process possibility of simultaneous pieces of information. The competence of firefighters is based on the unity of theoretical knowledge and practical experience. Building on practical experience, the different mechanisms like analogical thinking, critical analysis, satisfactory procedure, decisions based on exceptions, creativity and heuristics, together with the internal triggers, hold as pillars and make recognition-primed decision procedure of firefighting managers operational. Author illustrates the above as a complex system of emergency decision-making of firefighting managers in figure 6.

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