

***Man-made Disasters* twenty years later.**

Review of B. A. Turner, N. E. Pidgeon, *Man-made Disasters*, Butterworth- Heinemann, Oxford, 1997.

Almost twenty years after the first edition of *Man-made Disasters* we may thank Nick Pidgeon for completing the revision of the original text and adding a new chapter which takes on the contributions to discussion of disasters since the model of *Man-made Disasters* was originally framed. Barry Turner was working at the revision of this book when he suddenly died - in February 1995- and left various notes on the bases of which Chapter 11 was written.

In this review I will try to introduce the reader to the basics of Turner's model, discussing its influence on later developments in the field but also pointing out its intrinsic limitations.

In 1978 Turner coined the term "Man-Made Disaster" (MMD) to denote a type of disaster previously undistinguished from natural ones. MMD suggested that it was possible to learn from major man-made disasters as a class of incidents.

Since *Man-made Disasters* was first published, a series of dramatic incidents have heightened public awareness of how technical, social, institutional and administrative arrangements can produce disasters. The scientific debate has been enriched by two principal schools of thought: Normal Accident Theory on the one hand, and High Reliability Theory on the other. In the foreword to the present edition of the book Rosenthal writes: "Man-Made Disasters will be a mediating force between those believing in high-reliability organizations and those stressing the problem of accident-prone systems".

The dialogue between the two schools revolves around the question of whether reliability, resilience and learning can be inscribed in organizations by design. As Sagan (1993: 207) notes: "The High Reliability school argues that trial and error learning, supplemented by an active search for improvements, can eventually lead to improved safety even in operations involving hazardous technologies. This learning capability is essential to their argument". For its part, the Normal Accidents school argues that the real world often give ambiguous feed-back, that learning takes

place in political environments, and that secrecy restricts vicarious learning. High complexity and tight coupling in organizations are structural conditions which hamper learning. In Sagan's own words, there are intrinsic limits to safety.

Turner, in his last works (Turner, 1992; 1994; 1995) on organizational learning and safety culture, and Pidgeon (1996) too, take up a similar position: "by bridging the gap between theories of vulnerability and those of resilience, we might come to realize that there are indeed limits to safety, but they may not be quite so narrow as we like to think" (Pidgeon, 1997in press). Now that we know the end of the story, let us start from the beginning and exactly from the implicit assumptions of the MMD model.

The first assumption is that disasters are not - in Turner's words - "bolts from the blue" but they have preconditions: long incubation periods, and early signals which are ignored or misinterpreted. Disasters arise from a lack of some kind of knowledge at some point. Several factors urge the extension of our knowledge about the conditions that generate disasters:

demographic: increases in the world's population;

administrative: the energy sources which can give rise to MMD are increasingly controlled by centralized bodies and organizations,

technological: we rely on energy sources which are potentially much more destructive than traditional ones (chemistry, transport)

ecological: our capacity to intervene more frequently and more profoundly in processes affecting the environment (ozone, cloning).

The point, therefore, is that we should understand disasters as a "socio-technical" problem where social, organizational and technical processes interact to produce the disaster.

The second assumption is that organization is concerned with intention and the execution of intention. Disasters always represent a failure of intention, a failure of foresight. Turner views a sociological definition of disaster as raising a challenge against existing cultural assumptions. We can conceive a disaster as an "an event, concentrated in time and space, which threatens a society or a relatively self-sufficient subdivision of a society with major unwanted consequences as a result of the collapse of precautions which had hitherto been culturally accepted as adequate" (p.70). The advantage of this definition is that it covers instances where the amount of physical damage is not great, but the mishap reveals a gap in defences which were regarded as secure and a need for cultural readjustment.

People measure disasters and accidents against their intentions that order shall develop and extend into the future. MMD concerns the relationship among information, error and surprise in

organizations, given that responsibility for failure can be just as scattered and fragmented as responsibility for success.

In my view, the strength of the MMD model, both as a descriptive tool and in its later development as a diagnostic and learning aid (Toft and Turner, 1987), depends on the qualitative methodology used by the original research project and on its match with the empirical facts to be explained (Turner, 1983, Gherardi and Turner, 1988). Turner's model, in fact, is an emergent model grounded on qualitative analysis of 84 official reports into accidents published by the British Government during the years 1965-75. The book still has the style of a "grounded theory" research report.

In *Man-made Disasters*, in-depth analysis of three major MMD - at Aberfan, where a colliery tip slid down into the village, at Hixon where a large load was trapped at an automatic level crossing, and at the Summerland fire in a new leisure centre- reveals a pattern of events with the following similarities:

1 *Rigidities in perception and beliefs in organizational settings* which prevented accurate perception of the possibility of the disaster.

2. *The decoy problem.* In a number of instances when some hazard was perceived, the action taken to deal with the problem distracted attention from the problem that eventually caused the disaster.

3. *Organizational exclusivity: disregard of non-members*, i.e. the organizational tendency to deny remote dangers enables administrators to dismiss those who disagree with the organization's policy as "cranks".

4 *Information difficulties.* These divide among four classes: 1. completely unknown prior information; 2. prior information noted but not fully appreciated; 3. prior information noted by someone but not combined with other information at an appropriate time; 4. prior information available but ignored because there was no place for it within prevailing modes of understanding.

5 *The involvement of strangers, especially on complex sites.* Hazardous situations exist when those people not directly under the control (and the proper training) of any of the organization concerned at a site can put themselves in position to activate the hazard by behaving improperly. They may be members of the general public and in a sense "strangers" to that site. Turner's concept of "on site" is intriguing because it refers to the fact that any concrete or material system possesses numerous properties, all of which are potentially evident when the system is directly encountered. A "site" represents the concrete aggregation of whatever abstract systems have been imposed upon it and its planners or users become involved at that site in a multiplicity of systems, some designed,

some unpredictable. Large-systems planning encounters difficulties in organizing precisely because of this "on site" situatedness. For example: "the design of subways as means of separating pedestrians and traffic overlooks the opportunity created "on site" for these subways to be used by teenage gangs or by exhibitionists"(p.57).

7 *The minimizing of emergent danger*, which takes the form of: 1. an underestimation of possible hazards, minimizing emergent danger by insulating emotion against an idea which is accepted cognitively; 2. conflicting views about the danger; 3. changed awareness of danger as attempts to control the situation; 4. failure to call for help.

8 *Nature of recommendations after the disaster: the definition of well structured problems*. Recommendations are designed to deal with the well-structured problem defined and revealed by the disaster rather than with the ill-structured problem that existed before it.

The model is developed further through analysis of other disasters and acquires the characteristic process dynamic of a sequence of events associated with the development of a disaster in five stages: from the notionally normal starting point, through the incubation period, the precipitating event, the onset, rescue and salvage, the first stage of adjustment to full cultural readjustment. The incubation period can vary from few months to several years and it is in the meantime that unnoticed or misunderstood events accumulate.

The processes involved in the failure of foresight during the incubation period are identified as:

1. erroneous assumptions by those who could have noticed them;
2. information handling difficulties;
3. a cultural lag in existing precautions which makes violation of regulations unnoteworthy;
4. a reluctance to envisage the worst outcome (reluctance of those discerning the events to place themselves in an unfavourable light).

Notable in the MMD model is the organizational dimension of disasters, since "Individuals are rarely in a position to create major disasters without official or unofficial access to the energy and other forms of resources controlled by organizations, for organizations have a near-monopoly of control of most of the sources of energy which could be discharged to produce disasters" (p.133). At the same time, it is paradoxical that order and disorder are closely interdependent in organizing: "unintended consequences produced within organizational settings make non-random use of the rule of organization in their propagation" (p.150). Any organized mode of relating to the environment creates the possibility that "the organizing element may operate to produce or magnify unintended consequences in a surprisingly ordered way" (ibidem).

The reader is also reminded that organizational culture in MMD is simultaneously "a way of seeing (which) is always also a way of not seeing" (p.49). Organizational culture as a way of seeing can be conceived as part of the equipment which organizations use to act organizationally upon the world, but it is also "a collective blindness to important issues, the danger that some vital factors may be left outside the bounds of organizational perception" (p. 47). And this is because "organizations have two relevant properties: they are able to take misunderstanding or misinformation and amplify their effects in a way which is far beyond the capabilities of any individual; and they are likely to be able to combine these misunderstandings with an access to transformative sources of energy which are not likely to be available to the isolated individual" (p.153).

In my opinion the enduring actuality of the MMD model rest on its dynamic nature and on its complex understanding of the organizational dimension of disasters: not only man-made but also organization-made disasters, and in this respect all organizations, are equally disaster-prone.

Pidgeon's preface clearly outlines the limitations inherent in the original MMD model and sets it in its historical context. The model is most immediately applicable to "sudden onset" incidents. It does not deal with the different characteristics of more incremental onsets like those of environmental or ecological disasters, the types of disaster now most salient. This observation was offered by Gephart in 1984, after the Seveso and Three Mile Island incidents heightened public environmental awareness. The model's cognitive approach to disaster preconditions belittles power relations and vested interests in the run-up to major failure. But this attention rule is implicit in the methodology of the research, which relied on written texts prestructured in a way that certain questions were precluded. Finally, the model is a descriptive-analytic one which seeks to understand the causes of disasters rather than prevent them.

This latter point is very important when evaluating the influence of MMD model on the subsequent literature, and when we seek to understand the development of Turner's thought after the first book - especially when he was joined by new scholars in a common research programme. The last chapter of MMD, written by Pidgeon, provides an extremely useful map of post-MMD developments in the field as complementary theoretical frameworks (Janis, Perrow, Reason, Vaughan) and new research questions have taken the stage.

The challenge offered by MMD, according to Pidgeon, can be framed thus: Can a theory of accidents be translated into a theory of safety?

Researchers and practitioners are now concerned to specify the organizational preconditions that may enhance crisis management, safe performance and risk-handling. However, the two research

lines cannot be easily transformed one into the other, and understanding how institutional vulnerability arises does not imply an ability to predict resilience. The last chapter of the book discusses the significance of an organizational culture of safety - on the basis of works by Turner and by people working in related fields - and of wider discussion on the possibility for learning from disasters and the meaning of contested concepts like culture and learning in an ideological debate. The semantic field of risk is changing (Turner, 1994), and this may induce us to reflect on how little we still know about the social construction of safety, about reliability and about social responsibility towards present and future generations. Contrary, though, to the implications of those who have recently 'discovered' risk (Giddens 1990, 1991; Beck 1992) modern society has no monopoly over a concern with the future.

Giddens does not argue that modern social life is inherently more risky, but rather that the concept of risk has become fundamental to the way in which people organise their world (Giddens 1991:3). As a consequence of our growing ability to collate and to reflect upon larger bodies of knowledge about risk, a shifting, changing pattern of risk assessments and judgments comes into being. In a kind of 'colonisation of the future', risk calculation turns the intrinsically unknowable into a new terrain of possibility (Giddens 1991: 111), on which several risk ironies arise - according to Turner (1994):

1. *risk is now widely studied but highly contested.* "There is no expert on risk" Beck observes (Beck 1992: 29),
2. *the mathematical and philosophical bases of risk are disputed.*
3. *the growing technicisation of risk operates alongside narrow consideration of emotions and a limited regard for ethics.*
4. *risk has to be something that is taken, or risk is something which can afflict us?*

In such an intriguing debate the meaning of "safety culture" is created in a social conversation - or an argument - on what is safe and what is not. Is this the safer society we are able to build?

As regards this new edition of MMD we can hazard the prediction that it will not lead to a disaster. On the contrary, it will engender full acknowledgement, in European and North American debate, of a pioneering work which traced the development of a sociology of risk long before established sociology did so.

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