Bending The Rules:
Managing Violation in the Workplace

Patrick T.W. Hudson, W.L.G.Verschuur
Centre for Safety Science, Leiden Unniversity
D. Parker, R. Lawton,
Department of Psychology, Manchester University
Gerard van der Graaf, SIEP.

Abstract

When the assumption that people will follow the procedures is broken the whole basis of the Safety Management System is put at risk. The main reasons for violation are: *Expectation* that the rules will have to be bent to get the work done; *Powerfulness*, the feeling that one has the ability and experience to do the job without slavishly following the procedures;*Seeing the Opportunities* that present themselves for short cuts or to do things 'better'; *Inadequate Work Planning* and advance preparation, leading to working 'on the fly' and solving problems as they arise. These four factors allow good prediction of whether people are likely to bend the rules or not. Having good intentions, being closely watched over for rule-breaking and having the threat of punishment when caught are *not* good predictors. One factor that helps is having strong *personal norms*, values, that may be translated as believing in good engineering practice.
The approach taken in this paper is that advantages are there to be taken, but that rule-breaking or bending is so dangerous that the process has to be carefully managed. Most violations are preventable. This can be done by either changing the rules or avoiding the problem.

Introduction

Why do people bend the rules, deliberately failing to follow procedures? Violations are deviations from the rules, procedures, instructions and regulations developed for the safe and efficient operation (or maintenance) of equipment, plant etc. Deviations from good practice, even when not laid down formally, may also be regarded as violations. Breaches in these rules can be either unintentional or deliberate. The importance of violations in industrial safety was brought to the fore after the Chernobyl accident. Here, of the 7 human actions that led directly to the accident, 5 were deliberate deviations from written rules and instructions rather than slips, lapses or mistakes[1]. An examination of railway accidents in Britain between 1989 and 1992[2] revealed that violations play a considerable role in accidents to staff, e.g. personal injury and fatalities. Many accidents within the oil and gas industry are caused, at least in part, by violations committed by one or more people.
Violation, then, forms one of the major causes of accidents in industry. There is an assumption that people will follow the guidelines and procedures as laid down in the Safety Management System. When this assumption is broken the whole basis of the SMS is put at risk. However, while the deliberate failure to follow known procedures is called a violation when it goes wrong, when it succeeds it may be called the exercise of initiative. Because of this paradox, violation can not be stopped simply by telling people never to do it. Violations in which a negative outcome is *intended*, such as willful acts of sabotage or vandalism, are beyond the scope of this discussion. Violations in the workplace occur for many reasons, but, contrary to expectations, are usually the result of well intentioned staff, attempting to get the job done, rather than, as might originally be expected, by those who are only interested in their own comfort[3].
The introduction of HSE Management Systems has led to a significant increase in the assured safety of workers and guaranteed asset integrity. Many of the controls put in place within the context of the HSE-MS are administrative, that is they rely upon procedures, training and management processes. There is, necessarily, an assumption that people will follow the guidelines and procedures as laid down in the SMS. When this assumption is broken the whole basis of the SMS is momentarily put at risk.

Procedures

Without procedures and clearly defined guidelines, there would be no violations. Improving the quality of the procedures is one of the essential solutions to the problem of violations. What field studies have shown,

however, is that people's *perceptions* of procedure quality are a poor predictor of whether there are problems or not[4]. Nevertheless no procedure is perfect, not all situations will have been thought of in advance. But, either thinking that there *are* problems or feeling that the procedures are good both turn out to be misleading. This has to be seen in the context of the current high level of quality of procedures in the North Sea where this study was carried out.
There are three procedure problems that have to be identified and can be associated with different types of violation:

1. Poor procedures that are not followed - **Routine Violations**
2. Special situations that are not or poorly covered in the procedures - **Situational Violations**
3. Situations that are not covered by any procedures - **Exceptional Violations**

The reasons why the perceptions of procedure quality and the actual quality are not well correlated are complex[4]. In the case of many routine violations they may have become so routine that not following the procedures no longer contributes to the feeling that rules are being broken. With exceptional and situational violations, perceptions of the adequacy of the procedures are determined by remembering when one last broke the rules oneself, not by the quality of those rules. Finally, given that procedures are generally very good, the reasons why people feel happy or unhappy about their procedures are, in general, very individual.

There is one other procedure problem, not leading to violations, but still dangerous. This is when people persist in following incorrect procedures. Studies in the American Nuclear Industry have found that the majority of procedure problems are of this sort. A typical example is a procedure that requires testing a valve with the instruction "Open and close the valve"; people often stop at this point, without returning the valve to the open position which was the intention of the procedure writer (the open/close operation was a quick check that the valve works, things should be left as they were afterwards).

The most common reasons for changing procedures are reactions to incidents. This almost invariably results in more complicated procedures, with extra checks and balances built in. Many procedure problems arise because there is not enough time to perform all the actions required, checks are redundant or seen as unnecessary, or people feel that they know of a better way of doing the task.

Natural Born Violators - Wolves in Sheeps' Clothing

While it might seem obvious to start by looking for violations, fixing the causes and therefore feeling satisfied that the problem has been solved, a study offshore[5] suggested that even in the absence of violations the ground may still be ripe for violation behaviour to strike as a 'bolt from the blue'. Asking people offshore about their actual history of violation, and analysing the data into dimensions which suggest whether individuals are likely to violate if the circumstances arise, led to two dimensions.
One dimension was *Sheep vs. Wolves*. Sheep are, approximately, those who do not like violating; they feel unhappy with their own behaviour even if they feel compelled by circumstances to bend or break the rules (see Types of Violation below). Wolves, in contrast, have no such problems.
The second dimension was *Sheeps' Clothing vs. Wolves' Clothing,* how do people look to others. This second dimension reflects whether people have actually found themselves rule-breaking or not in the recent past. People who violate *look* like wolves, while those who do not, *look* like sheep; but appearances can be deceptive. Another way of expressing this is to think in terms of *Natural Born Violators*, people who are naturally opportunistic and who have no great problem with bending or breaking (unnecessary) rules if it serves their purposes, such as satisfying their boss, getting the job done in record time etc.
Four groups can be identified[5]

- *Sheep in Sheep's Clothing* (up-front sheep) were 22.5% of the workforce responding. This first group represents the guardians of standards.
- *Wolves in Sheep's* Clothing form 33.8% of the workforce, the largest group; they have not violated, *yet*, but will not have great problems with it when they do.
- The smallest group were *Sheep in Wolves' Clothing* (14.1%), who had violated, but weren't happy with this themselves.
- 29.6% were obvious *Wolves*, who reported violating and had the characteristics of violators.

These results mean that in the study 56% of respondents did not report a major history of violation, but that 63.4% of the population studied were Wolves, while only 43.7% reported having violated recently. Most strikingly 78% have either reported violating or will have no problem with violation when the time comes. Only the 22.5% of Sheep in Sheeps' clothing remain with a reasonable guarantee that they have not and will not bend the rules.
Every organisation needs both Sheep and Wolves. Sheep are the guardians of high standards, people who manage critical activities and who are not afraid to shut down whatever pressures might be brought to bear. Wolves see opportunities and grasp them, interpreting procedures more as guidance than as rules. The end justifies the means, for Wolves, but not for Sheep. An organisation composed totally of Sheep may go bankrupt, while an organisation of Wolves is likely to go bang! Both are needed, the art of the manager is to balance the two, to ensure that the need for actual violation never arises and to create conditions in which initiative becomes productive and not dangerous (realising that probably all managers are Wolves, or won't admit to anything else). The existence of all the Wolves means that even without obvious rule breaking, the grounds for violation may well be present. The fact that they form the majority of employees in the Oil and Gas industry in the North Sea only highlights the need for timely and effective management. The proactive approach is intended to allow the diagnosis of those grounds and the construction of an effective plan of action.

Why is violation a problem? Human Error

Violation is one of the four major forms of human error (see Fig. 1). It is distinguished from the more ordinary forms of error because there is the *intent* not to follow the rules; both the action and the specific behaviours are intended, unlike mistakes where the action may be intended, but the behaviour is unintended in the light of the possible outcomes[6]. Most forms of human error are not only unintentional, they can also be detected and recovered from. This means that someone who makes a simple slip or even a lapse can often detect that they have done so and take appropriate action. When you take a wrong turning off a road, this is usually quickly obvious and the route to recovery simple. Mistakes are harder, but even here it may be possible to put things right once someone discovers that they are acting mistakenly. A mistaken choice of route to avoid a traffic jam may turn out eventually to be just that, a horrible mistake as you sit in an even larger queue, but even then some recovery is possible even if detection, that all is not well, often takes longer. Violations, on the other hand, are intended, although not because the violator intends harm (In such cases we would talk of criminal activity). There is a certain correlation between the types of error, the existence and effectiveness of techniques for their avoidance and the opportunities for harm.

- Most slips are benign and, because they are often quickly detected, frequently do not lead to damage or injury. Any system that is so designed that a slip, such as selection of the wrong one of two identical-looking buttons on a control panel, leads to a disastrous outcome, is unacceptable. Such systems should have been identified and rectified by the Safety Management System. As slips are caused by factors such as haste and divided attention, good work planning is also a highly effective remedy.

- Lapses are more dangerous because they may be missed; it is harder to spot that you haven't done something. Forgetting to replace a gasket, failing to torque up a flange, missing a vital isolation check are all examples of lapses. The problem may be compounded by the person's thinking that they *have* done the job completely, so an extra round of checks is no longer necessary. Lapses are especially dangerous in maintenance, where a problem may lie unnoticed until it is too late. Many aviation accidents are caused by forgetting to replace O-rings. Safety Management Systems can require checks and balances for safety-critical activities, which forms one type of defence against the lapse.

- Mistakes are even more dangerous than lapses because those making a mistake think they are doing the right thing. They can be so sure of themselves that evidence telling them they are wrong is ignored. A mistake, such as failing to understand a pattern of alarms and deciding what to do on the wrong hypothesis, leads to performing the wrong corrective actions; it may be the first explosion that signals that a mistake was underway. Safety Management Systems will find mistakes harder to combat, but good training, supervision and support certainly help reduce the chances of making mistakes.

- Violations are most dangerous of all. They often represent a quite deliberate intention not to follow safety or other procedures which put everyone at peril. Safety Management Systems are not constructed with violation in mind and only truly inherently-safe systems could be automatically expected to survive all sorts of violations.

The Types of Violation.

There are five main violation types that cause problems for organisations attempting to control behaviour.

Unintentional violations. Erroneous or unintentional violations occur for two main reasons. First, they arise from procedures which are written in an attempt to control behaviour that it is impossible for the employee to control e.g. "do not slip or remain in control of your vehicle at all times" (an example from the British Highway Code). Second, unintentional violations may occur when employees do not know or understand the rules. This may be particularly relevant to new employees or when completing tasks that require adherence to a large number of rules. These violations, but for the existence of a rule, would be considered errors. Strictly speaking, the definition of violation requires that deviation is deliberate, i.e. intentional. However, from an organisational perspective, it is important that the unintentional violation of formal procedures be avoided.

Routine violations. Violations of this kind, as their name implies, are common practice. They often occur with such regularity that they become automatic and unconscious behaviours. Such deviations from formal working practice are often perceived by employees to involve little risk and are accepted by the particular work group as the normal way of doing the job. In this case, violating the rule has become the group *norm.*

Situational violations. These violations occur as a result of factors dictated by the employee's immediate work space or environment, which make it difficult for the employee not to commit a violation. Factors such as time pressure, lack of supervision, unavailability of equipment and insufficient staff all have implications in terms of situational violations. For example, when an operator improvises because the equipment specified in the procedure is not available.

Optimising violations. This category of violations is related to the nature of the job or the task itself; as optimising violations frequently occur in an attempt by the employee to make a job more exciting or interesting. These violations are related to the non-functional aspects of work e.g. a desire to impress or to relieve boredom. These violations are also associated with staff testing the safety boundaries of the system. In such cases staff may actively search for ways of improving production. These violations are more common when employees are involved in long periods of monotonous work, (such as monitoring work) or jobs where the rules are overly restrictive or seen as out of date.

Exceptional violations. As their title suggests, these violations are rare and tend to happen only in very unusual circumstances e.g. an emergency, or where something goes wrong e.g. equipment failure. Exceptional violations can be the result of either conscious decision making or instinctive reactions. An example of this type of violation might involve an employee entering a vessel to assist an unconcious colleague who has been overcome by fumes, despite rules that forbid such rescue attempts.

Before embarking on a mission to ensure compliance with all existing rules and procedures, it is necessary for managers to asks themselves a number of questions:

- *Do employees know and understand the procedures?*
- *Do we need all of these procedures?*
- *Are there situations when it is impossible to apply procedures?*
- *Does the job itself encourage violations?*
- *Is it possible to have a procedure for every situation?*
- *Are there alternatives to procedures?*

It is worth remembering when reading this guide that deviance from procedures is not always bad - sometimes it saves lives, and so it follows that compliance with procedures is not always good - sometimes it

kills. Ed Punchard, a survivor of the Piper Alpha disaster describes the behaviour of people on the platform during the disaster[7].

"All over the rig, people were instinctively following their training and emergency instructions. In the absence of any form of announcement, most were trying to make their way to the galley to muster, have a head count, and take instructions. After all, that was what they were trained to do. (p.128)".

Tragically the accommodation was in the line of the fireball when it erupted, meaning that the majority of people who had complied with the emergency procedures did not survive. Those who did survive were those who disobeyed instructions and jumped.

Why is Violation so Dangerous?

There are several reasons why violations increase the likelihood of an accident.

- Violations take people outside the boundaries of safe working practice, making the environment less forgiving to errors. In other words, violations circumvent one layer of defence, the rule book, which aims to ensure predictable and safe working practice.
- Violations can themselves be errors when the individual does not know or understand the rule. This lack of understanding is dangerous in itself, because while not appreciating the risk, people often fail to protect themselves.
- Violations can take people into new or unpracticed situations, in which the person is more likely to make an error.
- Violations are breaches in the last line of defence. Procedures are barriers put in place because you have run out of all other possibilities such as design, hardware and avoidance of the problems.

Violations involve *knowingly* doing something or, conversely, *knowingly failing* to do something, such as a full electrical isolation. Violations are worse than mistakes because they invariably put the system out *on the edge* (Figure 2). A system that, before any maintenance work starts, should be electrically isolated and tested as hydrocarbon free, will be much more open to disaster if one or both of those steps are skipped. The real problem can be understood when we realise *that the violator almost always assumes that everyone else will do the right thing*. But this assumption is no guarantee that someone else will not commit an error, such as dropping a ferrous hammer and creating a spark, or turning on a piece of electrical equipment when under the mistaken impression that this is just what is required at the time. Other peoples' slips and mistakes form the second half of the equation [2] that shows how seemingly 'safe' rule-bending can turn into disaster.

Violation + Error = Death/Doom/Disaster

Speeding in the desert is not a problem until the driver has to cope with driving through the windrow, where a turn in the wrong direction can mean a high speed roll-over and, all too frequently, death (especially when the occupants are not wearing their seat belts either). All of a sudden a simple and apparently quite safe activity, just driving a bit faster than the official speed limit, can turn into a lethal factor.
Other evidence for the role of violations in accident causation also comes from work in the field of driver behaviour. Parker, Reason, Manstead & Stradling[8] surveyed 1656 drivers and using the Driver Behaviour Questionnaire examined the relationship between driving behaviour and accident involvement. They found that self reported violations, those behaviours that involve deliberate deviations from safe driving practice, were found to be predictive of accident liability. The self reported tendency to make errors (e.g. misjudge the speed of an oncoming vehicle) or to have lapses (e.g. attempt to drive away from a traffic light in third gear) did not predict accident liability. Violations were found to be a statistically significant, positive predictor of accident involvement, even after the effects of exposure, age and gender had been partialled out.

Why do People Violate? The Behavioural Cause Model

Figure 3. shows the *Behavioural Cause Model*, developed to explain why people violate.

- People behave the way they do because they plan to do so.

- Plans are made up to take account of 1) external requirements, the work to be done, rewards and supervision 2) the intention to do things according to the book, 3) the expectations that yet again corners will or will not have to be cut, 4) the existence of opportunities to get things done quicker or better.
- Intentions and expectations are determined by attitudes to work and to the violation of procedures, by past experience, by social norms and by feelings of being in control or of being out of control of one's own actions.
- The loss of a feeling of control can mean that previously well thought out plans are short-circuited by events and conditions.

Motivation is seen as a general factor, making things better or worse; a well motivated person is more likely to see an opportunity, and bend the rules to take it, less highly motivated people are less likely to be affected by norms and attitudes to do things properly.

Testing the Model. The Behavioural Cause Model was tested on 182 operators and supervisors offshore in the North Sea[3]. This study had two goals. The first was to test the Behavioural Cause Model; it was found that the model allowed successful prediction of 64% of the variance in violating behaviour with just four major factors that provided the dominant drive to violate;

1. *Expectation* that the rules will have to be bent to get the work done;
2. *Powerfulness*, the feeling that one has the ability and experience to do the job without slavishly following the procedures;
3. Seeing the *Opportunities* that present themselves for short cuts or to do things 'better';
4. Inadequate *Work Planning* and advance preparation, leading to working 'on the fly' and solving problems as they arise.

If you know how someone will answer questions about those four factors, you can make a very good prediction of whether they are likely to bend the rules or not. On the other hand, having good intentions, being closely supervised and having the threat of punishment are not good predictors. The reason for this is that, within Shell companies, these problems have been solved; at least so far that extra effort here will not help a lot. In the North Sea, offshore workers have good intentions about not breaking rules, but end up doing so anyway because of the other factors. One factor that helps is having strong *personal norms*, values, that may be translated as believing in good engineering practice.
The prediction that can be made is of 2/3 of the variance in violating behaviour. Predicting or explaining the variance is a measure of accuracy, and also indicates how much other factors *not* considered could also be effective. A proportion of variance explained in excess of 60% means that any other factors will have a minority effect. To put this in context most such predictions of behaviour are about 20-30% accurate and even massive opinion polls before elections can only reach such accuracy with samples in excess of 1000 and with very simple voting behaviour. This study allowed an empirical assessment of the importance of the different factors and the extent to which changes in contributory factors might be expected to produce changes in the probability of violating.

An Alternative Model - Supervision and Punishment. A number of alternative models, explaining why and how people violate, can also be tested with the data collected in the North Sea study. The most obvious is one which assumes that people are basically bad and lazy, violating unless they are forced to do the right thing. The most effective methods of controlling violations in this *Supervise & Punish* model are detection of violation by supervisors and strong punishment by both supervisors and managers whenever violations are detected. Violators are seen as poorly motivated, especially with respect to safety. While the Behavioural Cause Model explained in excess of 60% of violating behaviour, this Supervise & Punish model could also be tested and was found to explain only 20%. When the two are combined, by adding the Behavioural Cause Model factors and the Supervise and Punish factors into the equation, the total variance explained only rose from 62% to 67%. This small increase of only 5% is partly due to the fact that many of the effective elements in the Supervise and Punish management approach have already been taken up by factors such as planning and expectation.
The message is clear: management of violation requires understanding of the significant driving factors rather than being based initial preconceptions that are untested in practice. Concentrating upon detection and

supervision will only produce marginal improvements, while concentrating upon the significant factors in the Behavioural Cause Model will produce major improvements.

Approaches to Managing Violation

The approach taken here to violation is that advantages are there to be taken, but rule-breaking or bending is so dangerous that the process has to be carefully managed. Most violations are, in fact, preventable either by changing the rules or avoiding the problem. What remains must be managed by recognising the types of people who are performing the work - using the theory - and by understanding why violations are so dangerous.

The recommended remedies for violation problems, called ***Division I*** remedies, are:

- ***Supervision*** - coach people, plan their work, provide an example (not policing and punishment)
- ***Analysis of existing violations*** - find the background behind violation behaviour
- ***Analysis of violation potential*** - use the theory to see if people will find violating easy
- ***Structured discussions*** - discover what is going on and get people to agree on actions
- ***Procedures*** - improve the quality of procedures so violation is not seen as necessary
- ***Direct management*** - a technique to vary the procedures as circumstances demand

Less effective, and therefore less recommended remedies, are called ***Division II*** remedies:

- ***Selection*** - pick people who won't be tempted violate to start with
- ***Training*** - train people more on the real risks and the possible consequences
- ***Detection*** - sharpen the lookout for violations
- ***Reporting*** - encourage people to report when they or others bend the rules
- ***Incentives*** - pay for compliance or punish people who break the rules

Of these different remedies Selection and Training can work on Attitudes and Incentives can affect Personal Norms. However they can all have nasty side-effects, as selecting more compliant workers requires that the planning process be considerably improved. Another side-effect of training is that it may *increase* the feeling of powerfulness, making violation *more* rather than less likely. Analysis of existing violations is effective, but violations are actually not so common, so analysis of the conditions is more likely to prevent problems in the future. Structured discussion groups can find out what needs fixed first. Finally, once the most common routine violations have been swept away, a rigorous management approach to unusual situations can be applied instead of having people taking dangerous initatives.

The reason why remedies are placed in Division II are because they are less effective in combatting violations and they often have side-effects that negate the positive benefits. Selection of a compliant workforce, for instance, means that workers are more likely to follow incorrect procedures. Studies in the US nuclear industry have found that the majority of procedural problems arose from people following bad procedures, not for failing to follow good ones! The survivors from Piper Alpha were those who did not follow the procedure. Those who went to their muster station and waited, died. Selecting compliant workers therefore places more pressure on the planning process to ensure that problems do not arise in the first place. Training is essential in competence-based workforces, but possession of extra knowledge is one of the major factors behind powerfulness, one of the most important causes of violation. Detection and reporting can create strains and require a strong and blame-free safety culture. While these strategies do not create problems, they are less effective than the Division I remedies at tackling the same problems. Finally incentives are never very effective on their own and can have serious negative side effects when handled incorrectly.

Proactive and Reactive Approaches

Two approaches can be taken in HSE management tools. The *reactive* approach involves waiting until something goes wrong, and then finding out what the problems are and why they happened.The *proactive* approach requires some analysis *before* things go wrong, followed by fixing problems before they turn into accidents. So accident investigation and incident analyses are primarily reactive, although strong because something really has gone wrong for an accident to happen. Tripod DELTA [9] is proactive, nothing has gone wrong, and always open to the argument that what hasn't gone wrong yet won't necessarily go wrong in the future. For violations there are also two equivalent approaches. The reactive approach involves looking to see

what violations people are actually performing, so that they can be stopped and managed. The proactive approach requires looking at the grounds which allow violations to take place.
There are a variety of techniques within both proactive and reactive approaches. Because the types of violation and the reasons for violation are so many, it is necessary to first find out what and where the problem might be, and then to select the remedial approaches that are most likely to be effective. There are many perfectly effective steps that can be taken. What should be avoided, however, is taking unnecessary action for non-problems, ones that have already been solved. The most specific lesson that has been learned is that in Shell Comapnies in the North Sea environment, the problem of Intention is not really a problem - people have good intentions. The steps needed to solve intention problems are, therefore, only necessary to ensure that intention does not become a new problem if conditions ever change. If, however, intention is not a problem, is there anything that is? Because people are still violating, the answer to this question is almost certainly yes. The reasons for violation are bound up in the ways we do the work, the people we like to hire and the ways we expect them to go about their business.

Conclusion

The message is clear, management of violation requires understanding of the significant precipitating factors rather than being based upon preconceptions untested in practice. Concentrating upon detection and supervision will only produce marginal improvements. Concentrating upon the major factors in the Behavioural Cause Model, in contrast, can produce major improvements. The effectiveness of different remedial measures can be assessed, to allow prioritisation on the basis of data rather than impression and prejudice[10].
If you want to know if people are going to violate, don't ask what they *intend* to do; we know that answer. Ask them what they *expect* they will have to do. If they say they may well have to break the rules, ask why and ask why nothing has been done about it so far. The remaining ingredients of the lethal cocktail are a feeling of absolute competence (in the face of impossible procedures and situations), poor planning of the work to be performed, and the recognition, usually by well motivated personnel, of opportunities. Do not expect that punishment will be an effective solution; most of the violators in the study were trying to get the job done, on time or faster, in the face of procedures that seem to them to be impossible to follow in the real world.
Violations aren't all bad, they are the exercise of initiative when they are successful, but they are dangerous because violators always assume everyone else is keeping strictly to procedures. If someone else makes an error or something goes unexpectedly wrong, then the violation can become extremely dangerous, otherwise it can be very advantageous. This means that simply trying to stop rule-bending is to fail to understand a complex phenomenon. The pay-off for success when rule-breaking, taken together with the perceived chance of success, is much greater than the possible bad consequences, especially when people strongly believe that it won't happen to them.
A number of different approaches to stopping or managing violation are available. The solution to tackling the disease of violation is to seek out the appropriate remedies and apply them rigorously. The remedies can be distinguished into *First* and *Second Division* remedies. First Division remedies are the most effective. Second Division remedies *may* be effective but certainly have nasty side-effects. Most people tend to prefer a lot of Second Division remedies, but the field studies have shown that these are less effective. One of the reasons why violations in the workplace are so hard to manage is the tendency for managers and supervisors to believe that the Division II remedies are the most appropriate, based upon 'folk' psychology rather than scientific data. The belief that individual characteristics are the main cause of rule-breaking behaviour leads to searching for remedies in areas such as selection, training and incentives. The facts are that the real causes lie predominantly outside the individual, in poor planning, failures to improve procedures, the existence of opportunities. The major individual characteristic that is important, powerfulness, is just the one those managers and supervisors probably possess most strongly - which is why, when the opportunity arises, it is just those people who exercise initiative, by bending the rules.

References

1. Reason, J.T. The Chernobyl errors. *Bulletin of the British Psychological Society*, **106**, 321-331. (1987)
2. Free. R.J. *The Role of Procedural Violations in Railway Accidents*. Unpublished PhD thesis, University of Manchester. (1994)

3. Verschuur, W.L.G., Hudson, P.T.W. & Parker, D. (1996) *Violations of Rules and Procedures: Results of item analysis and tests of the Behavioural Cause Model. Field Study NAM and Shell Expro Aberdeen.* Report Leiden University for SIEP.
4. Hudson, P.T.W., van der Graaf, G.C. & Verschuur, W.L.G Perceptions of Procedures by Operators and Supervisors. SPE 46760. This conference (1998)
5. Hudson, P.T.W. & Verschuur W.L.G. Why People offshore Bend the Rules. Report for SIPM, Centre for Safety Science, Leiden University. (1995)
6. Reason, J.T. *Human Error.* New York: Cambridge University Press. (1990).
7. Punchard, E. *Piper Alpha: A Survivor's Story.* London: W.H. Allen. (1989).
8. Parker, D., Reason, J.T., Manstead, A.S.R., & Stradling, S.G. (1995). Driving errors, driving violations and acident involvement. *Ergonomics*, **38**, 1036-1048
9. Hudson, P.T.W., Reason, J.T., Wagenaar, W.A., Bentley, P.D., Promrose, M. & Visser, J.P. Tripod DELTA: Proactive approach to Enhanced Safety. *Journal of Petroleum Technology*. **46**, 658-62. (1994)
10. Zeitlin, L.R. (1994). Failure to follow safety instructions: faulty communication or risky decisions? *Human Factors,* **36**, 172-181

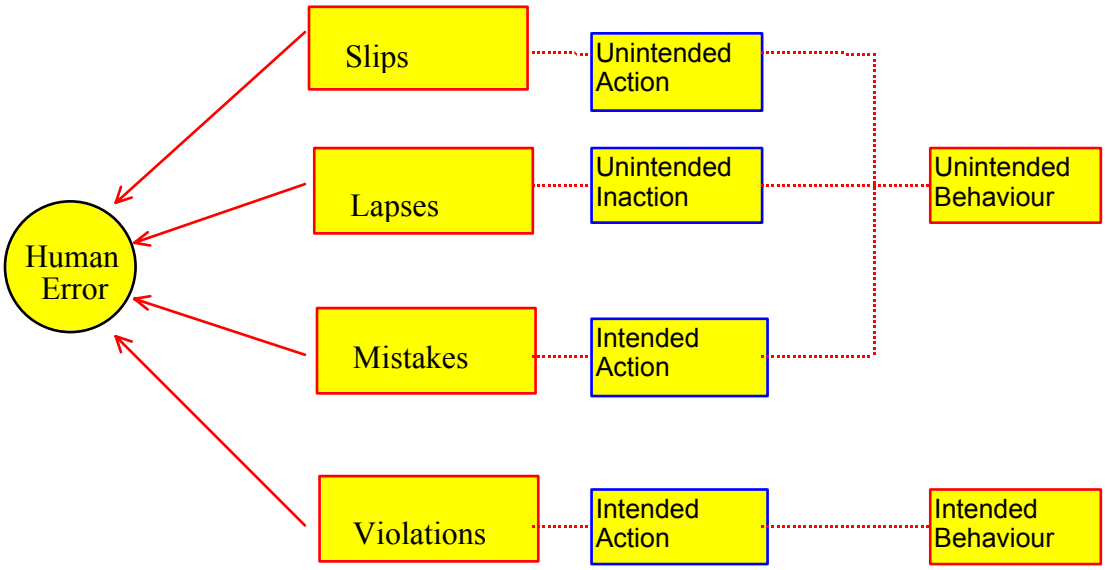

Figure 1. *A violation is a sort of mistake, in that few people actually intend things to come to harm (in our settings at least), so what actually happens is also not intended. The behaviour is quite deliberate, and the actions that make up that behaviour are also intended. Behind most violations, however, there is still a 'good' will. Criminal behaviour is characterised by a lack of good will, as well as intended behaviour and actions.*

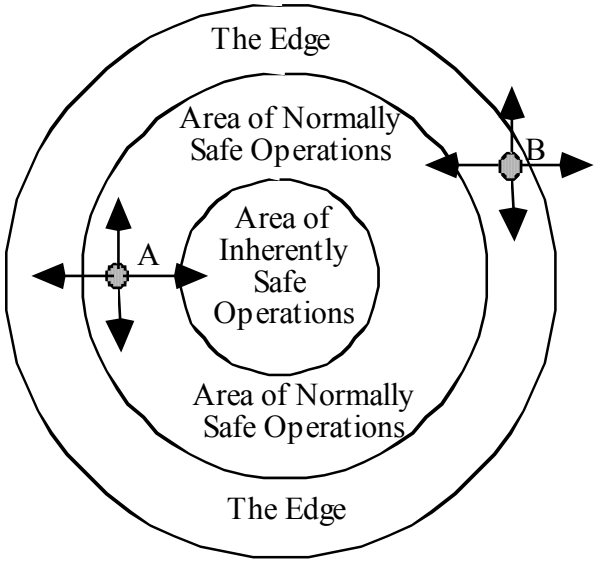

Figure 2. *The operating envelope. Specific events such as A and B each introduce some perturbation. In the case of A, within the Area of Normally Safe Operations, possible outcomes range between inherently safe and may approach the edge. Event B, however, has many outcomes that go over the edge, even if there are also some that move the system into normally safe operation. In this representation an error may be regarded as increasing the radius of outcomes around the event point.*

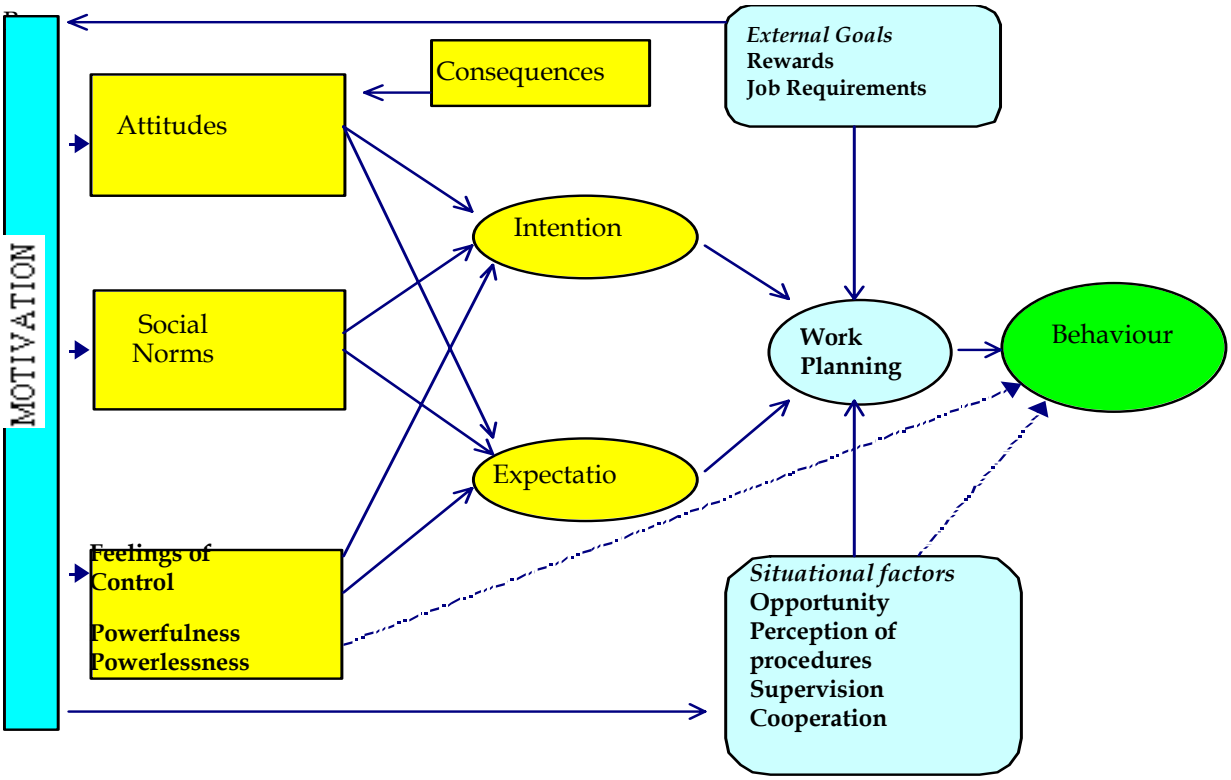

Figure2. *The Behavioural Cause Model.*

Division. I Remedies
• ***Supervision*** - watch more closely over people, plan their work, provide an example

- ***Analysis of existing violations*** - find the background behind violation behaviour, and fix it
- ***Analysis of violation potential*** - use the BCM to see if people will find violating easy, and fix the problems found
- ***Structured discussions*** - discover what is going on and get people to agree on actions that get carried out
- ***Procedures*** - improve the quality of procedures so violation is not seen as necessary
- ***Direct management*** - a technique to vary the procedures as circumstances demand

Division II Remedies

- ***Selection*** - pick people who don't violate to start with
- ***Training*** - train people more on the real risks and the possible consequences
- ***Detection*** - sharpen the lookout for violations
- ***Reporting*** - encourage people to report when they or others bend the rules
- ***Incentives*** - pay for compliance or punish people who break the rules