The Blameworthiness of Health and Safety Rule Violations*

I.   INTRODUCTION

Immediately after a man-made disaster has taken place, journalists, politicians, policy

makers, and scientists ask how it could have happened and how similar failures can be

avoided in the future. Very often part of the answer to the first question is that the

breaking of safety rules contributed to the accident. The radiation accident, which took

place in a nuclear plant in the Japanese village Tokai in 1999, resulting in forty-nine

casualties, provides an example of this reaction. It was concluded that this accident would

not have happened if the employees had followed the official rule to transport uranium

through pipes, instead of pouring it into a petrol tank with a bucket (Van der Lugt 1999).

Another example concerns the disaster that took place in 2000 in a fireworks warehouse

in the Dutch city of Enschede. This disaster resulted in the death of twenty-two people. In

this case, the use of illegal storage containers and trade in illegal fireworks were

identified as important causes of this explosion (Oosting Committee 2001).

If the answer to the first question is that the breaking of rules contributed to an

accident, the answer to the second almost automatically is that inspections regarding

compliance with the rules must be intensified and that sanctions for breaking them must

be augmented. Such measures are often proposed by the highest political leaders after a

disaster. President Clinton did likewise after the disaster with TWA's Boeing 747

airplane in 1996 (Eijsvogel 1996), and Prime-Minister Major did it as well when it became known in 1997 that the Ministry of Agriculture had repeatedly ignored emergency signals of abuses in British slaughterhouses (Wittenberg 1997). In the Netherlands the chairman of the committee Oosting even advocated a "cultural revolution" of the entire public administration after the aforementioned explosion of the fireworks warehouse in Enschede and a fire in a bar in Volendam that killed thirteen adolescents on New Years Eve 2001 and wounded roughly 250. After both disasters each evaluation committee concluded that administration had systematically turned a blind eye to rule violations (Alders Committee 2001; Oosting Committee 2001).

On the one hand, the more or less automatic reflex to intensify the enforcement of the rules is understandable. It gives a clear signal to the victims and citizens that disasters are taken seriously and that authorities act strongly in response to them. In this way, the responsible authorities try to restore the loss of faith among the population. As such, this measure has an important symbolic meaning. On the other hand, this measure also raises an important question. Namely, it presupposes that the persons involved with these rule violations should have known that sooner or later these would end up in an accident and that they ought to have taken this knowledge into account. In other words: the safety rules were good and could be complied with and the violators were wrong. This paper deals with the question whether this accusation is always justified. Precisely the fact that it is often the people who are supposed to be protected by the rules who break them leads to the presumption that they are too easily defined as human errors. In other words, this fact raises the question whether it is right to assume that the people involved are either always free to comply with the rules, or take risk when breaking them. Our aim is to find out

whether this presumption is right or not.

This aim has simultaneously moral and instrumental implications. If rule breakings cannot automatically be labeled as human errors then this raises the questions whether it is justified to blame rule breakers automatically and whether the tightening up of enforcing safety rules is always an effective measure for the prevention of man-made disasters.

The answer to the research question is based primarily on a qualitative case study of a Dutch coke factory. This factory is a business unit of a multinational. Operators work with inflammable, explosive and harmful chemicals, and powerful machines. They do heavy and dirty work under unpleasant weather conditions. During the last two decades of the last century hundreds of incidents have happened in this factory, varying in severity from a bruised ankle because of stepping on a piece of coke until two casualties as a result of falling from great height. Other serious wounds resulted, for example, from a short circuit in an electricity closet, an exploding starting motor, and a fall in a tank filled with caustic soda. Also several very dangerous situations occurred that could easily have caused serious accidents. For example, a large part of the gas cleaning section burned down and a huge ventilator flew over a dune top after it broke off. These events demonstrate that wrong decisions in the coke factory can have very nasty consequences for the workforce and its surroundings. Nevertheless, rules were broken regularly. The reasons of operators to deviate from safety rules were analyzed in order to answer the question whether these acts could be labeled as human errors automatically. The case study is complemented with additional data to illustrate that the findings are not unique to the coke factory.

II.   RISKS AND FACTS

I will evaluate rule violations in terms of the reasons employees give for breaking rules, and not, as is usually the case with respect to man-made disasters, in terms of their effects. This is a deliberate choice. Rule breaking is automatically condemned in disaster evaluations just because they have led to an accident. The fact that an accident has taken place is put forward as the undeniable proof that the violation was a human error. This argumentation may seem conclusive, but is in fact not. The fundamental problem that is connected with the judgment of human conduct following disasters was put forward by Barry Turner in 1976. He criticized the official evaluation reports of three industrial disasters on which his own analysis is based. In his opinion, these three reports are problematic because they do not take into account that the situation before the disaster was significantly less clear for the people involved than was concluded afterwards:

> "Each [report; PM] dealt with the problem that caused the disaster as it was later revealed and not as it presented itself to those involved beforehand. The recommendations, therefore, treat the well-structured problem defined and revealed by the disaster, rather than the pre-existing, ill-structured problems" (Turner 1976: 393).

In this article, he describes a model consisting of different phases in relation to the failure of foresight, which he developed more thoroughly in his monograph Man-made Disasters (Turner 1978). In the first phase of this model, "the way the world is thought to operate" synchronizes with "some true state of affairs". Then the so called "incubation phase" starts.

During this phase, perception increasingly deviates from "true" reality. This eventually results in a disaster. Finally, this disaster results in a situation in which people obtain a realistic perception of reality again. According to Gephart (1984), the risk of overestimating human errors is also inherent to this model. Namely: it is only possible afterwards to decide which risks were overlooked or denied. According to Gephart, the people involved are confronted with hard to interpret, often contradictory messages and interests, in such a way that their perception of reality can only be labeled as wrong on the basis of after-the-fact knowledge:

> "Communication problems and unheeded warnings conceived by Turner as central to the pre-onset stages are actually only seen in retrospect (Perrow 1981). They are present in all disasters and in a variety of non-disasters as well. Considerable noise blends with potential warning signals to mask the warnings; they are distinguishable from normal signals and false warnings only after the fact" (Gephart 1984: 211).

The only, and justified, reply that Pidgeon & Turner (1997: 175) give to this criticism in the revised and enlarged second edition of Turner's Man-Made Disasters is that it is not relevant for the phase model exclusively, but more generally to all post hoc case studies of man-made disasters (The Journal of Contingencies and Crisis Management 1998, vol. 6, nr. 2 is dedicated exclusively to the second edition of Man-Made Disasters).

Vaughan (1996) has convincingly demonstrated that the overestimation of human errors as a result of the reconstruction of disasters is not just a theoretical problem. She has done this on the basis of research on the cause of the explosion of the space shuttle Challenger in 1986. The television images of this disaster, leading to the death of all seven

crew members, including primary school teacher Christa McAucliffe, who was to promote this journey by teaching about it, are undoubtedly still remembered vividly by many. Vaughan demonstrates that the dominant explanation of this disaster was completely wrong. The dominant interpretation was that the Challenger exploded because of individual errors and managers violating crucial safety rules in their quest for profit. She concludes that conformity to the dominant culture rather than deviation from it led to the disaster. One of the most important causes of the accident was that the importance of scientific proof was stuck to for too long. Consequently, the vague indication that problems with the O-rings of the rocket boosters were caused by low temperatures were not taken seriously, while this very thing proved to be the direct cause of the disaster.

Vaughan could only draw this conclusion because she tried "to forget" that the disaster took place. She did this by limiting her analyses mainly to documents concerning decisions made before the disaster. This method made it possible for her to imagine how the people involved defined the situation at that time. According to Vaughan, their definition of the situation shows clearly that the accusations that followed the disaster are totally unjustified. This is the reason that she cites Starbuck and Milliken with approval, concluding that "retrospective analysis of bad organizational outcomes tends to focus attention selectively on the road not taken that might have altered the outcome" (Vaughan 1996: 253). An inherent problem of evaluation research of man-made disasters is thus that the people involved are judged on the basis of the knowledge that their conduct has had serious consequences, while they could not be certain about it themselves by definition. This is the reason that, in this kind of research, there is always the danger that the possibilities of the people involved to prevent the accident – e.g., by complying with the safety rules – are

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overestimated.

Is it easier to evaluate human conduct objectively by analyzing socio-technical systems that did <u>not</u> cause any disaster, as is done by researchers working on the so-called <u>High-Reliability Theory</u>? (see, for example, Weick 1987; Roberts 1990, 1993; Schulman 1993; Weick & Roberts 1993; La Porte 1994; La Porte & Rochlin 1994; Roberts, Rousseau & La Porte 1994; Weick, Sutcliffe & Obstfeld 1999). The answer is no. Before underpinning this answer I will summarize the content of this theory. This theory is supposed to explain why socio-technical systems, mostly American aircraft carriers, have remained accident free. The explanation is short: because they carry out an effective policy to prevent these accidents. Sagan (1993: 17) sums up the four following policy characteristics that would determine the accident-free status of highly reliable socio-technical systems: i) great ability to learn from mistakes, ii) presence of political leaders and managers giving the highest priority to the safety and reliability of installations, iii) high levels of redundancy – backups – of personnel and technical safety devices, and iv) a "high reliability culture", consisting of decentralized and consistently executed procedures.

It is not a coincidence that the explanation for the absence of accidents given by High-Reliability Theory only refers to policy. This theory seems to presuppose that the fact that accidents have not taken place proves that human conduct has been effective. However, this presupposition lacks empirical foundation. The reason for this is that High-Reliability Theory is limited to socio-technical systems that have remained accident free so far: "If we only examine systems without failures, as the "High-Reliability Theory" are prone to do, we are "selecting on the dependent variable", that is, examining favorable outcomes only and then predicting what brought them about" (Perrow 1994: 214). A systematic comparison of

the accident rates of organizations which do and do not satisfy the four policy characteristics is lacking. The first consequence of this is that other causes of the accident-free status of the systems under scrutiny which are not the result of human conduct – e.g., coincidence – are incorrectly not taken into consideration. It has been demonstrated, for example, that nuclear military complexes have never caused a major accident although they do not have all the characteristics of reliable organizations (Sagan 1993; Bourrier 1996: 105). The possibility that these systems have remained accident free, in spite of the actual policy, is overlooked altogether (cf. Weick 1997: 399). However, this cannot be ruled out beforehand. Perrow (1984), Wildavsky (1988) and Sagan (1998), for example, argue that redundancy is a source of risk rather than a source of success. Weick (1998: 73) and Pidgeon (1998: 100) do the same with a homogeneous (safety) culture because it excludes deviant views. So, while accident research has a tendency to judge human conduct too severely, High-Reliability Theory tends to be too positive about it.

This means that the chance of an incorrect evaluation of human conduct is inextricably bound up with both accident research and High-Reliability Theory. The knowledge that an accident has taken place pushes researchers in the direction of the verdict that the people involved should have anticipated the disastrous consequences of their behavior. The knowledge that a certain branch of industry has remained accident-free easily leads to overlooking human errors. Researchers of man-made disasters tend to overestimate human errors, while researchers who make use of High-Reliability Theory run the risk of underestimating them. The problematic similarity of both types of research is that explanations are sought for events that have already happened. In the former case, they look for causes of accidents, and in the latter for why there has been an absence of accidents. This

is the reason that I evaluate rule violations according to the risks that accompany them instead of their actual consequences. The people involved act in uncertainty about the consequences of their conduct and ought to be judged accordingly. This means that my analysis concentrates on the chance of an accident and not on the certainty of an accident or the absence of it, as is done in the other two research approaches. The point of departure of this analysis is that employees who deliberately take risks, even though they are not hampered from not doing so, are blameworthy. One cannot automatically speak of a human error if one of both conditions is not met.

III.   COLLECTION OF THE DATA AND DESCRIPTION OF THE CASE

The coke factory is located on an industrial terrain in the Netherlands together with ten other factories. The central Health and Safety department helped me to gain admittance to this factory. A member of this department asked which of the five factories of the "steel section" wanted to participate in my research. The main reason the management of the coke factory volunteered was to get to know more about the causes of accidents. The accident ratio of this factory had remained above average after heavy investments in health and safety. Management wanted to know why.

I have collected the data for my Ph.D. project on the handling of health risks (Mascini 1999) at two moments: 1995 and 1998. During the first period of data collection I accompanied different work shifts during their operations and attended their meetings for one month. During conversations I asked employees which risks they were exposed to, what

they themselves or the organization did to control these risk and what else should be done to improve risk management. I also asked about the making and applying of risk management instruments like inspections, regulations, and accident reports. This helped me to find out how these instruments worked out in practice.

In the second round of data collection I surveyed a cross section of the personnel. Hundred and four employees responded to a questionnaire on paper and 69 did so orally. All operational personnel and managers occupied in the production and maintenance department were asked to take part in the survey. The response was 72 percent. The majority of the non-response consisted of employees who were not able to respond because of illness, absence, or insufficient mastery of the Dutch language. The questions of the survey concerned the priority given to health and safety and the intensity and the style of influencing others or being influenced by others with regard to risk management. In all oral interviews respondents were asked to give specific examples of influence attempts. Many of these examples related to the handling of safety rules. The interview fragments given below were translated from Dutch into English.

At the time of the data collection, a permanent staff of about 270 worked in the factory, divided over the production, maintenance, and technology departments. I labeled the management and the shift supervisors of the coke factory as middle management because they were subordinated to the board of directors of the overall concern. Middle management was responsible for the implementation of company policy and for daily management. Although middle management predominantly enforced safety regulations, it occasionally had to comply with the rules as well. Middle management had to comply with general safety rules when they physically went into the factory. In addition, they had

to comply with more specific rules when they were involved in operational tasks. Operational personnel also shared in the responsibility to enforce health and safety rules. It was their formal duty to report dangerous situations, such as the violation of health and safety rules by colleagues and superiors. However, most of the time, operational personnel just had to comply with the rules. This means that both middle management and operational personnel were responsible for enforcement as well as for compliance, although the priority of enforcement lay with middle management and for compliance with operational personnel.

IV.   RESULTS: THREE TYPES OF RULE VIOLATIONS

The bulk of the numerous safety rules of the factory are complied with without hesitation. This is done at the cost of considerable effort and expenditures. One can think of the purchase and the use of personnel protection devices, the registration of permits to work inside the factory, working according to regular procedures, reporting operations, and doing health and safety audits. The employees not only usually comply with the rules because they think of them as useful but also because they give a very high priority to healthy and safe production. In the survey personnel were asked how important healthy and safe production is in relation to seven other goals. The average score was 4.6 on a scale ranging from one (least important goal) to five (most important goal).[1] Their reasons for attaching so much importance to this goal are the ample availability of scientific knowledge about industrial risks, the low tolerance for these risks in society,

and the tight laws to qualify for social benefits for illness or disability. Still, employees regularly break rules. What is the reason for this and to what extent can these acts be labeled as human error? I have found three kinds of reasons for breaking the rules that differ in the extent to which they are blameworthy.

A. TOO MUCH EFFORT OR TOO MUCH TROUBLE

The first reason for breaking rules is taking a deliberate risk because complying requires too much trouble or effort. Hutter (2002: 241) also found that "'taking the easiest and most convenient' option" is a common explanation of non-compliance of the workforce of British Rail. One example from the coke factory that illustrates this kind of violation concerns a mechanic repairman:

> R[espondent]: "Whenever I think, 'Oh dear, and now I might have to do
> overtime', then I think, 'Screw it'. […] Then I do it secretly you see. […] Then I
> think, 'They don't see it anyhow'." […]
> I[nterviewer]: "Can you give an example of this?"
> R: "[…] Well, in the hall with the gas pipes. We were working on oven twenty-
> one. At a certain moment we had to remove a closing valve. So I had a working
> permit with me and fire hoses and two fire extinguishers. You see, we thought we
> were ready and we went on with oven twenty-three. We dropped the fire stuff, fire
> extinguishers and all, but then we had to get back to oven twenty-one. We still
> had to grind two bolts. I say to my buddy, 'I am not going to drag all this shit
> back, so leave it here'. So then I went back just like that. I thought, 'Nobody will

come anyhow'. I say to my buddy, 'You go and watch out, and I will grind in a hurry'. Well, that's what I call quick and secretly. That's what I said just before, you know. You do it because of the danger of fire, gas danger."

I: "I see. You ground when the fire stuff was not there?"

R: "Right. We had been busy there just before".

I: "And then you had forgotten those two bolts?"

R: "Right, and then we thought, 'Shit, quickly those other two bolts'. Before you realize it, you are busy for yet another half an hour. You have to empty the hose, you have to wind it up totally, you have to bring it there, you have to go back and forth three times. Then you think, 'Let's do it quickly'', and that's what I call secretly, you know, because if someone sees it, you're in trouble." (Mechanic repairman)

It is easy for an outsider to underestimate the nuisance certain safety devices can cause in practice. For example: protective fire clothes can cause overheating during operations at the top of ovens that are already hot, the use of safety spectacles which is a nuisance for some people who normally do not wear spectacles, stiff pigskin gloves cause blisters during cleaning operations, and lack of ventilation in so-called airstream helmets give certain people a headache. It is also not easy for an outsider to realize that it costs relatively much effort to comply with every safety rule consistently. One has to walk long distances repeatedly to get forms signed, one has to order a tower wagon at the right time to be able to work safely at great height, one has to wait for the approval of an inspector before climbing scaffoldings, etc. From this point of view, it is understandable that personnel sometimes take a risk to avoid the nuisance or the effort that goes with

systematic compliance with all the rules. However, although this type of violation is understandable, it does not exonerate those who break rules; on the contrary. They take a risk deliberately, even though nothing obstructs them from not doing so. If these violations result in an accident, the people who violated the rules can be blamed for it.

B. DILEMMAS

It is less easy to condemn the second type of rule breaking. This is when people know that it increases the chance on an accident, but are obstructed from complying. In these cases, one is forced to choose between two evils. Why so? Formally, producing ought not to undermine safety in the coke factory. This rule is more than just words. Management definitely makes an effort to put this rule into practice. However, it happens that superiors tell their subordinates to make exceptions to the rules if the continuation of the production process is in danger. A mechanical inspector gave an example of this type of violation. He says that he has to comply with all regulations during planned, weekday activities, while he was told to deviate when an urgent problem occurred:

> R: "Look: as soon as you see the production process is troubled, then all of a sudden a lot of things can be done without consideration of the safety rules. When we weld in the gas cleaning side, we have to have a working permit, need to have fire extinguishers present, and have to take a carbon monoxide sample. Once something went wrong and then only a sample was taken. We didn't have a working permit, and we could get going just the same. Then I think to myself: 'Well, why could it go so fast that time,' because then you can get started within

ten minutes, 'and why, on a weekday, does all of this have to happen with forms and stuff?' There are boys who really carry such a big pile of paper every week. Then I think to myself: 'Well, guys, it's a nice system, but it just doesn't work'."

I: "And what was your reaction at that time?"

R: "At that moment, you just get started, of course. Look, and when you bring it up, then it's sort of laughed about. And that's logical, because you're attacking people [supervisors; PM] on things. They, of course, try to make a joke of it, but still it's not the way, of course. And I repeat: then it is possible, but if you come normally during the week, then it isn't possible." (Mechanical inspector)

Operational personnel usually do what they are told, even though this means that they have to break the safety rules. Some of them do so because they agree that complying with all the rules is not as important as meeting the production targets. Others do so under pressure from their superiors. The reason for this is that superiors rarely accept a refusal of a subordinate to execute an illegal assignment. They then carry it out themselves or give it to another subordinate. In the first case, it happens that superiors put pressure on the refusing person not to make it publicly known. From the point of view of their stronger hierarchical position, this is a kind of blackmail. An operator gives an example of this kind of pressure:

R: "I've seen it happen that slopes were piled up with cokes due to production difficulties. A fire developed on top of the slopes which I had to put out. I couldn't reach it because the jet only goes so far. So I'm standing outside the fence putting out the fire and soon someone from middle management approaches, takes the water pipe away from me, climbs on top of the fence, and

stands like this to reach only one meter further. Then I said: 'Well, that's really

safe' and he says: 'You've seen nothing, or else you have to put it out yourself.'

Then I said: 'I saw nothing if that's what you want.' I could have argued with him

then, but that wouldn't have done any good. […] And because he's a boss, it gets

a bit difficult. They say they don't let that influence them, but,.."

I: "You noticed that [the manager abused his position; PM]?"

R: "Absolutely. Of course, but that's only natural. If you have the chance to get

even with someone who has made a fool out of you, you do it." (Operator)

Executives who give a refused assignment to another subordinate will normally opt for

sarcasm instead of blackmail. In this case, blackmail to maintain secrecy is not evident,

because not only the person who refused is aware of the illegal assignment but also the

next person who gets the assignment. The first aim of emphasizing publicly that someone

has exaggerated the risks connected to the refused assignment is to legitimize their own

behavior. The second aim is to discourage people from refusing similar assignments in

the future. In the next text fragment, an operator gives an example of a situation in which

his shift supervisor made it public that he exaggerated when he refused to descend in a

scaffold tank into a large generator:

I: "You have mentioned that middle management example twice already - that

they wanted you to do certain tasks. Can you tell me what that was?"

R: "I'm willing to tell you about that example, but I think it has happened several

times. I don't know if you know anything about the biological cleaner. There

you've got the two big generators filled with water. That's the new bio. The water

was emptied from this tank. Then a steel scaffold pipe had to be taken out from

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the bottom at about seven meters. A crane operator was present, but he didn't

have a tank to lower a person in, no crane tank. Then my shift supervisor told me:

'Then we'll take a scaffold tank that has those scaffold pipes in them and then

we'll stand in that.' I refused to do that and then he did it himself in that manner,

even though the crane operator also indicated he wouldn't take that

responsibility.' And that wasn't even the worst part. Afterwards, I often enough

had to hear: 'Yes, but I did get it out alright, didn't I?' Then I think: 'Your

reaction is stupid because you created an unsafe situation and then you try to

congratulate yourself afterwards'." (Operator)

This means that employees who are ordered to violate safety rules to prevent loss of

production face an awkward dilemma. If they refuse to execute these assignments or

make them public, then there is a real chance that their superior will punish them for it. If

they carry out the assignment, then they will most probably be blamed for it if something

goes wrong (cf. Fischer 1993). The trail over the death of ten mineworkers in Austria

after a lime mine collapsed is a clear example of this (Jusek 2000). The manager who

ignored safety measures for years because of profit seeking was one of the accused. He

said he acted the way he did because the owner of the mine, Luzenac, wanted higher

profits. Now the prosecutor has sued the manager because his decisions caused a disaster.

However, if he had complied strictly with the rules, his employer would have punished

him for that. This means he was hampered from complying with the rules. Although the

pressure is less, the same holds for the employees in the coke factory who ignore safety

measures because their superiors tell them to do so.

The choice between production and safety is not the only dilemma confronting

personnel in practice (cf. Hutter 2002: 244). De Koning and De Vries (2001) show this in their research initiated after the aforementioned fire in the Dutch town Volendam on New Years Eve 2001. They studied the compliance with fire regulations by the catering industry in five Dutch towns. The owner of a bar made it clear that local authorities apply conflicting regulations: "The fire brigade says: garbage has to be put outdoors, because inside it is a risk. But refuse collection says: outside is not allowed, because it pollutes the street; keep it indoors". In this same study, an inspector noted that the door of an establishment opens to the inside, which can cause a concentration of people during panic situations, making it impossible to open the door. However, a door that opens in the "escape direction" leads to the public road and this is not allowed. In these cases, it is impossible to make an unproblematic choice because of contradicting rules. Rasmussen, Duncan & Leplat (1988) have shown that the lengthy execution of repetitive labor unavoidably results in human errors.

This leads to the conclusion that the more someone is obstructed from complying with the rules, the more problematic it is to speak of human error. In other words: without a clear structure supporting and encouraging moral behavior, it is unfair to blame employees when they do not conform (cf. Bovens 1998).

C. "IMPOSSIBLE" RULES

When the third reason is decisive for breaking safety rules, it is also improper to speak of human error automatically. This is when the people involved think that making exceptions to a rule does not increase the chance on an accident. This happens with what

employees call "foolish" or "impossible" rules. These concern prescriptions thought of as too general, far-fetched, or simply counter productive in certain situations. This type of violation differs fundamentally from the other two, whereby employees do not deny that the violation of the rule is risky. It is also the type that I have most frequently encountered. Hutter (2001: 244) also found that no less than 31 per cent of the workforce of British railway regarded safety equipment and occupational health and safety regulations as a hindrance instead as a help. A mechanic repairman of the coke factory puts this argument into words as follows:

> R: "You must finish a job within a certain amount of time all the same, but still you have to take care that it is done safely, but this does not mean that you have to use all safety instruments available. It can also be done safely in other ways. […] Many roads lead to Rome. There are also several ways to do it safely. And if you do everything according to the safety measures, you are busy one hour dragging around safety devices, while the job only takes five minutes. Then you can also do it with less, ah,…"
>
> I: "Could you give an example of this?"
>
> R: "Suppose that you have to weld something on the side where the gas is cleaned. First I have to pick up a fire form, then I have to get fire extinguishers, and then I have to get gear. I am busy for about half an hour. For a job that takes two or three minutes at the most. Then I say, 'Fetch a fire hose and it will work out just fine as well'."
>
> I: "I see. A fire hose instead of a,..?"
>
> R: "Yes, because they are present at that spot already. And I think that I am

working safely as well, because if something happens, I can extinguish it."

(Repairman)

The fact that the workers do not perceive risks when they break the rules does, of course, not automatically mean that there are actually no risks involved. It is well known that employees who are exposed to risks constantly get blind for these risks or deny them in order to reduce cognitive dissonance. An extreme example of this concerns steel workers on skyscrapers who totally black out the life-threatening dangers of their work in order to control their fears (Haas 1977). It can be argued that employees who violate rules because they think it is not dangerous, while in fact it is, make human errors.

In order to find out whether this was also the case in the coke factory, it was important to find out how middle management thought of the breaking of "impossible" rules by their subordinates. Supervisors are less likely to get blind for risks because they seldom carry out the tasks to which the rules apply. So, opposition of management to the practice of their subordinates may indicate that operational personnel do take risks when they break "impossible" rules although they do not perceive them.

Indeed, middle management is usually strongly opposed to this practice by their subordinates. Management not allowing operational personnel exceptions to rules generates many differences of opinion. These differences of opinion arise in all kinds of situations: working at great height without a safety harness, transporting chemical products of high temperature with rubber hoses instead of steal pipes, going in front of a large machine when you ought to climb over it, and working in the neighborhood of a running conveyer belt. They also take place in different phases of the work: while handing out assignments, during the supervision of operations, and during assemblies

where the implementation or adaptation of procedures and safety rules is on the agenda. These differences of opinion are not restricted to the coke factory either. It is common for so-called "street-level bureaucrats" to argue that formal rules fit in badly with the specific circumstances to which they apply. Management does not want them to take these circumstances into account because it obstructs uniform decision making (see, for example, Lipsky 1980). Still, there are to reasons why the denial of supervisors not automatically implies that operational personnel take risks when breaking "impossible" rules.

First, sometimes the perception of risks is not one of the reasons why middle managers refuse to allow their subordinates to make exceptions to the rules. Other reasons can be that they do not want to generate discussions after creating precedents or that they want to avoid the possibility of being held responsible for accidents resulting from rule violations they allowed. So, sometimes middle managers refuse to allow the breaking of "impossible" rules even though they do not perceive risks.

Second, and more important, is that management apply double standards. They often perceive risks when subordinates violate the rules, but not when they themselves execute the tasks to which the rules apply. This can happen when supervisors have to perform inspections inside the factory or when they have to help solving problems. Some of the managers who execute tasks break rules themselves, while they do not allow this to their subordinates. A shipping supervisor illustrates this in the next fragment:

R: "I think I often avoid certain things because I have been around for such a long time, and I know how it can be done safely as well. I'm talking about the fuel system now. We [shipping department supervisors; PM] always say to the boys:

'If you go to the program, turn off the gas pipes." For myself, if I have to do

something there, I don't always turn them off because I know what to do the

minute something goes wrong. If a battery just disgassed, then I know it takes

twenty minutes for it to switch to gas again. So, I have twenty minutes to do as I

please, without having to turn off the tap. And if it switches back on suddenly,

God forbid, then I know what to do. […] But to the boys I always say: 'Always

turn that thing off'."

I: "Aren't you ever called to account for not turning the thing off yourself and

always ordering them to do it?"

R: "No, because whenever the two of us walk there, I let the other one do the

operations the way they have to do it."

I: "So, they can't see it when you don't do it yourself?"

R: "No, and I myself think that there isn't any risk in that because I know damn

well what I'm doing, and when I have to do those operations, I think I do the rest

of it according to the formal procedure. Because I don't do it on a daily basis, I

also have to think about what I have to do." (Shipping supervisor)

Other managers who execute tasks do comply with the rules, but not because they think

this is safest. They do so because they believe they have to set an example for their

subordinates. Supervisors know that it frustrates their subordinates when they tell them to

comply with "impossible" rules. They want to preclude that it becomes harder to address

subordinates who violate rules because they themselves do not comply (cf. Hutter 2002:

250). In the next text fragment, a shift supervisor expresses the wish to secure authority

by complying with rules he in fact thinks of as superfluous:

R: "If I miss out just a little bit once and they see it, then they really exert pressure on me: 'You weren't doing the right thing there either. You see, if the production gets into hot water then,..'. As a shift supervisor, you are treading on eggs. If there's a malfunction somewhere or somewhere something is hanging loose. I don't have a fear of heights, so I climb on top of everything and everywhere. That makes no difference to me."

I: "Would you please give me an example of something that actually happened?"

R: "I can do that. We had a malfunction at the coke side: a cylinder had broken off and the wind was blowing hard. It must have been force-seven winds, and we stood on top of that installation and then we crawled over a fence and there we stood on top of that installation where we had to lean forward a bit. You do that without actually taking notice and then later: 'You were acting stupid and dangerous and this and that.' Afterwards I agree with them. Then I say: 'You've got a point there.' I won't do it anymore. Then you're a production man again like: 'Well, damned, that installation has stopped and we've got to produce again', and as far as that is concerned, we've had that Du Pont course. (The chemical concern Du Pont sells their safety policy to other companies, PM.) Then you first count to ten: 'Then they'll just have to wait a second'. First you collect a safety belt and only then do I go there. In your heart, you find it a bit of a comedy sometimes, but you have to set the right example. […] By virtue of my function, I have a role model function, and so I will do it sooner, while thinking to myself: 'I can also do it like that', but you don't do that anymore then." (Shift supervisor)

This finding shows that operational personnel are not the only ones who do not perceive

risks when they break "impossible" rules. The same holds true for the managers who occasionally execute the tasks to which the safety rules apply. Logically, this can mean two things.

First, they are both wrong because the execution of tasks leads to a false sense of security. It is well known that people who (think they) can exercise control over their environment themselves perceive less risk than those who cannot (Fischoff, Lichtenstein & Slovic 1981; Slovic 1987; Vlek & Keren 1992). This psychological mechanism could explain why middle managers perceive risk when their subordinates break rules, but not when they do so themselves. Performing operations offers the possibility to exercise control over the working environment personally, while enforcing implies dependence on others. It is also possible that such false sense of security occasionally results in taking irresponsible risks when breaking rules although this is far from self-evident. For, research demonstrated that moderate unrealistic optimism results in <u>more</u> preventive behavior instead of less (Otten 1998: 51/2).

Second, it is possible that there are no risks involved when operational personnel break "impossible" rules even though the enforcing supervisors think there are. Brun (1995) has found a convincing example of this possibility in his study on the ways high-tension thread electricians work. These electricians violated safety rules on purpose, even though they are exposed to life-threatening risks during their work on power pylons. Management strongly disapproved of these violations and accused the personnel of foolhardy and incompetent behavior. The electricians did have a good reason for it, however. Applying all the personnel safety devices decreased the visual contact with the working environment and hampered quick intervention in case something went wrong.

By omitting certain safety devices, they retained visibility, and because of that, control over their own working environment. Brun's study shows that regulation may actually be dysfunctional.[2]

So, employees may occasionally deny risks when they break rules or may have a false sense of security when they do. However, sometimes there are simply no risks involved when they do. It can even happen that complying with rules increases risks instead of decreasing them. This shows that rules are not good per definition, those who break them are not necessarily wrong. Though this conclusion is highly relevant for the determination of the blameworthiness of rule violations, it is definitely not new. Merton had already warned in 1957 that too much emphasis on bureaucratic discipline goes together with trained incapacity. By this he meant the elevation of compliance with rules into a goal in itself, with the result that the original goal of the rule threatens to be lost out of sight. Or, as Kagan (1978; see also Knegt 1987) put it: the letter of the law can get in the way of its spirit. So, sometimes compliance with safety rules is risky instead of breaking them. It is in these instances that it is problematic to label rule violations as human error.

V. CONCLUSION AND DISCUSSION

We have seen that in the coke factory three types of rule violations occur, just one of which can be labeled as human error without any problem. This is the type whereby employees violate the rules because they think of complying as too much trouble or

tiresome. These violations are blameworthy because this means that employees take a deliberate risk without being hindered in any way not to do this. The second reason is when external causes make it more difficult, if not impossible, for employees to comply with all the safety rules. The more obstruction people meet with, the less they can be blamed when they give in to it. The last reason for personnel to break the rules is if they think that complying is meaningless or even counter-productive. They cannot be blamed automatically for this type of violation either, for the simple reason that they are sometimes right. If they are right there is even more reason to praise rule violators then to blame them. This is especially so when they do this in a context where punishing is the standard. For this means they are prepared to control risk by breaking rules in the awareness they may suffer the consequences.

Apart from these moral implications, the findings also have instrumental value. They lead to the conclusion that the automatic response following man-made disasters to enforce severer is not always the most effective measure to prevent them. It is only so if rules are broken because of laziness. This type of violation is made less attractive by punishing rule violators. It is true that this is also the case if violations are caused by external causes, but, in this case, other measures are more obvious. Punishing is directed to the violator, while the cause of the violations lays somewhere else in this case. In these instances, better results can be expected from measures aimed at removing the factors hampering compliance than from more severe punishments for breaking the rules. If employees break the rules because they find them "impossible", it surely is important to be careful about tightening up enforcement. For if the rules really are not any good, then this measure increases the chance of an accident rather than reduces it. This leads to the

conclusion that it is important to take the motives and causes of rule breaking into account when enforcing.

       While this conclusion is at odds with the automatic reaction to disasters, it is perfectly in line with literature on enforcement. A punishment centered or legalistic approach is seldom considered most effective under all circumstances (Hawkins 1990: 462; Johnstone 1999; Tenbrunsel & Messick 1999, Simpson 2002: 136, 152; but see Pearce & Tombs 1990, 1991). Inspectors should act as "politician", "consultant", or "policeman" depending on the willingness and the capacity of individuals or corporations to comply with rules (Kagan & Scholz 1984). Severe sanctions should be reserved for the minority of "bad apples" that do not share regulatory goals (Makkai & Braithwaite 1994). Inspectors also try to put this ideal into practice. They try to match their enforcement style with their image of their targets (Hawkins 1984; Hawkins & Hutter 1993; Mascini 1999), though they are sometimes hampered to be coercive (Hawkins 1992; Wilthagen 1993) or not very particular about their methods (Braithwaite, Braithwaite, Gibson & Makkai 1994).

       Why are the conclusions that rule violations are not always blameworthy and that tightening up enforcement is not automatically effective not easily drawn from disaster evaluations? The reason is that evaluators are inclined to reason back from the consequences of the rule violations. Disasters are easily raised as evidence that rules should be complied with. The violation of the rule itself is not the focus of attention. Another problem with judging rule violations which have led to a disaster is that the persons who have committed them are almost inevitably judged more severely than those whose violations did not cause a disaster. This is problematic because, per definition,

both categories have committed these violations in uncertainty of the consequences of their acts. The unequal judgment of more or less similar acts is less likely when they are based upon <u>possible</u>, instead of actual, consequences. For such a judgment does justice to the uncertainty which is inherent to the choice of violating rules. This indicates the surplus value of risk research in comparison with disaster evaluations.

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1. The average scores of the other seven goals were lower: enabling good collegial relationships (3.3), providing maximum employment (3.1), producing environmentally sound (3.0), providing optimal chances to learn and to gain experience (2.9), offering optimal promotion chances (2.5), ensuring optimal incomes (2.4), and making maximum profits (2.3).
2. Two other examples of counter-productive safety rules concern the relationship between administration and industry. The American Ministry of Transport wanted to force upon the truck industry to introduce an "improved" brake system (Kagan & Scholz 1984: 89). The court struck down this rule, because of clear indications that this brake system was less dependable than the existing one and so increased the chance of truck accidents. The ministry unjustly stuck to the introduction of this rule, because it suspected the truck industry was opposed to this measure for purely economic reasons. In another example Baccus (1986) records that the maintenance and reparation of so called *multipiece truck wheels* had caused tens of casualties and hundreds of wounded in the United States. The Ministry of Transport had not taken any measures to prohibit this type of bus and truck wheels because it refused to acknowledge that the maintenance procedures did not link up at all with the way maintenance was put into practice. This means that garage mechanics stuck to their habits because garages did not dispose of the required space and protection devices and because most maintenance work was done in the open air.

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