

Security vs safety

PhD student Eirik Albrechtsen

NTNU - Norwegian University of Science and Technology
Department of Industrial Economics and Technology Management

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1 Background

This brief paper is written for use in the course ‘Security – analyse og ledelse’. The main purpose of the paper is to introduce the term security and to discuss differences between security and safety. The reason for this discussion is security management’s lack of academic foothold. Nevertheless, safety management has a long tradition of scientific research. Thus, as will be shown throughout the course, security management can learn a lot from the field of safety management. Some of the lessons on security management will be based on theories from safety management

The paper is based on previous work by Albrechtsen (2002)

2 Differences between security and safety

2.1 Grammatical differences

In Norwegian the word ‘sikkerhet’ translates both security and safety. Thus, it might be confusing for a Norwegian to distinguish them, since these words actually do not exist in Norwegian. Nevertheless, some groups at the Norwegian University of Technology and Science (NTNU) has distinguished the two words in Norwegian, saying that security is protection against *deliberate* incidents and safety is protection against *unintended* incidents (Hovden, 1998; Skavland Idsø and Mejdell Jakobsen, 2000).

NTNU definition (Skavland Idsø and Mejdell Jakobsen, 2000):

Safety is protection against random incidents. Random incidents are unwanted incidents that happen as a result of one or more coincidences.

Security is protection against intended incidents. Wanted incidents happen due to a result of deliberate and planned act.



The new Oxford dictionary of English (Pearsall and Hanks, 2001) describes the words in the following way:

Safety:

- 1) The condition of being protected from or unlikely to cause danger, risk or injury.
- Denoting something designed to prevent injury or damage, e.g. safety barrier

Safe:

- 1) Protected from or not exposed to danger or risk; not likely to be harmed or lost
- Not likely to cause or lead to harm or injury; not involving danger or risk
 - (of a place) Affording security or protection
- 2) Uninjured; with no harm done

From the Latin word 'saluses' – uninjured

Security:

- 1) the state of being free from danger or threat, e.g. "the system is designed to provide maximum security against toxic spills"
- the safety of a state or organizations against criminal activities such as terrorism, theft or espionage
 - procedures followed or measures taken to ensure such safety
 - the state of feeling safe, stable and free from fear or anxiety

From the Latin word 'securus'; 'se'-without, 'cara' – care, - 'securus' – free from care

Secure:

- not subject to threat; certain to remain or continue safe and unharmed
- protected against attack or other criminal activity
- feeling safe, stable and free from fear and anxiety

From the definitions presented in the frames, it can be seen that the differences between security and safety are not remarkable. Both are conditions where one is well protected and without risks. The basic idea of both is protecting assets from hazards/threats creating safe/secure conditions. The condition safety is about *being protected*, while the condition security is about *being free from danger*. The differences between being protected and being free from danger or threat are not easily seen. Being protected leads to a condition of being free from danger or threat, and being free from danger or threat might imply well protection. *Thus, the basic idea is the same for both.*

One part of security is protection against criminal activities. Simultaneously security is about being in a state of feeling safe, stable and free from fear or anxiety (no. 'trygghet'). Criminal acts are mainly deliberate acts, but they do not need to be deliberate; driving a car a few km/h over the speed limit is per definition a criminal act, nevertheless it can be an unintended incident (e.g. inattention on speed limits). Thus, I do not think it's correct to say, following the definition given by Hovden (1998) and Skavland Idsø & Mejdell Jakobsen (2000), to say that security is just about protection against deliberate acts. It is also about protection against unintended incidents that might bring one into a state of not being subject to threat.

It seems like one slight difference between security and safety is that security specifically protects against crime, while safety specifically protects human lives and health. However, I do not think this distinction is adequate. Protection of human lives

and health can be protection against deliberate (and criminal) acts such as murder attempts and violence. When an unintended accident at an industrial plant happens, it might be a violation of the Working Environment Act, which per definition is a criminal act. Taking shortcuts in order to get more efficient work and less workload are deliberate incidents as well, which might lead to an accident at an industrial plant. Ignorance of procedures leading to an accident is a deliberate incident as well. Thus, it will not be fully correct to say that safety is protection against unintended incidents.

It is about time to end this grammatical discussion before it gets even more confusing. It is definitively complicated to distinguish safety and security. The basic idea is the same in both understandings; *protecting assets from a possible hazard or threat*. Thus, it might be unnecessary to distinguish them. A slight difference seems to be that security is related to criminal acts (e.g. espionage, theft, terrorism) and that safety is related to the risk of injury of humans. As discussed above neither deliberate or unintended incidents are directly associated with criminal incidents or injuries. What the differences actually are, still remains as a question. Even persons with English as their mother language I have talked to, have difficulties by distinguishing the two. From these persons' point of view the difference lies in a kind of tacit knowledge, and is thus found difficult to describe.

2.2 Basic ideas of security and safety

In order to understand differences, we have to look at the basic ideas of both security and safety.

Traditions

At its simplest, safety means protection from accidents. This short expression gives a lot of possibilities bringing a number of issues into the safety science. Safety science is related to the health and well being of people at work and in other activities. The longest traditions of safety research come from the high-risk industries, including nuclear plants, shipping, offshore operation (oil and gas production) and transportation. The modelling of accidents may cover technological, human and organisational factors. Still, focus is principally on the unintended incidents (Kufås, 2002).

Security has its roots in theft protection. Today the field covers everything from personal to national security, including financial crime, information protection, burglary and espionage among others. Security relates to those problems where people act deliberately to gain profit or, for some reason, create harm. Consequently, financial business, the trading sector and the national defence have the longest traditions of security work (Kufås, 2002).

Hazards/threats

Safety is protection against *hazards*, while security is protection against *threats*. Within the field of safety, hazards represent a risk for human health and lives, environment, production and material objects. The hazards are tightly related to the concept of energy release. An incident involves a sudden and uncontrolled release of energy (Kjellén, 2000). The injury or damage develops when the uncontrolled energy hits the human body, environment or material assets. The energy might be

mechanical, chemical, electrical, thermal, kinetic, etc. Uncontrolled energy might develop due to mechanical failures, human failures and influence from the environment.

Threats within the field of security can always be tracked down to humans. Incidents is a result of a person or a groups will.

The threats within security can be divided into external threats and insider threats (i.e. inside the organisation). The external threats (e.g. hackers) principally imply deliberate incidents. This external threat makes the picture of threats more complex and adds uncertainty. It is impossible to control the external threat, the only thing the organisation can do is to protect oneself. Further it is difficult to predict the threat (where, when and how the attack appear), and it might be difficult to find the responsible after an incident since the attacker seldom leave any tracks behind. In contrast to the external threat, the insider threat can be unintended as well as deliberate. Within the field of safety, hazards are within the organisation.

The threats within industrial safety can be characterised as more proximate than within information security. It is possible to physically see and sometimes touch the hazard, while security threats are often not viewable and physically close (the threat can be at the other side of earth). This proximity within industrial safety provides a simpler and better overview of the hazard, which gives a good understanding of the hazard.

Deliberate and accidental acts

The hazard within industrial safety is mainly associated with unintended incidents, in contrast information security protects against deliberate as well as unintended incidents. The threats within security are related to human threats, as an incident most often is a result of one person or a group's will.

There are deliberate incidents in industrial safety as well. The difference between deliberate incidents in information security and industrial safety is illustrated in Figure 1. The figure shows deliberate incidents in industrial safety above the time axis, while deliberate incidents in information security is beneath the time axis. The arrows indicate how the purposes of the deliberate incidents are related to the causes, incidents and consequences. In industrial safety the purpose of deliberate incidents is not directly related to the incident and consequences. In contrast the purpose of deliberate incidents in information security is mainly to get a benefit from the incident, regardless of the consequences of the incident. The deliberate incident within industrial safety do not want incidents to happen, the deliberate acts are made in order to do work more efficient and less effortful. These deliberate acts can be characterized as cynical, calculating and ignorant. Deliberate acts within information security are malicious acts, forcing the incident to happen by the desire of beneficial consequences for the attacker. For a further discussion see Mølmann (2003).

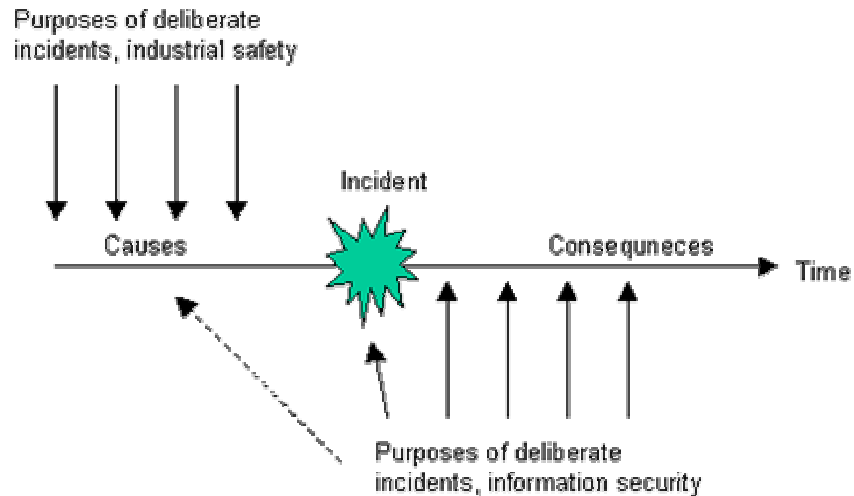


Figure 1 Purposes of deliberate incidents' influence on cause, incidents and consequences

Causes

Security relates to those problems where people act deliberately to gain profit or, for some reason, create harm. Hence, incidents are most often a result of a persons or a group's will. A safety incident usually has several contributors, such as bad conditions or several unintended actions. The accident is then a result of these contributors working together, which is outside the control of one person.

Security incidents are results of planned action, i.e. acting in way in order to achieve a wanted outcome (e.g. money), while safety accidents are unplanned (no one plans to cut his finger in a sawing machine). The security incidents are mainly malicious and criminal acts. Safety accidents are seldom, if ever, malicious, but they can be criminal as they often are violations against regulations (see section 2.1).

Losses

The losses within industrial safety are injuries and death of people, damage of the environment, material/production costs, delays in delivery and loss of reputation (Kjellén, 2000). The safety field is also related to reliability of industrial assets.

The range of consequences is broad for security, the losses are mainly related to physical assets and information. The losses are to a large extent directly related to economical loss (loss of income, material loss of technology, loss of man-hour, loss of reputation, insider incidents with financial gain as aim). It is easier to replace the losses within security than within safety, as it is more easy to replace stolen assets through e.g. insurance (if insured) than to bring back a human life.

Uncertainty

The uncertainty dimension of the threats are much more present within the field of security than in safety. This uncertainty on threats and consequences in security is created due to:

- High degree of complexity in information technology systems
- Unforeseen and unwanted interactions
- Non-proximity of threats, threats beyond sight
- External threats are difficult to predict and control
- Deliberate threats (internal/external) are difficult to predict
- Broad range of threats
- Change of technology
- Need for knowledge to understand the information technology

Surroundings

The security field is more regulated as well as affected by the society, than what is the case of safety. Security problems reflect the society through its social structure, economic conditions, its perception of law and crime, and its morality (Kufås, 2002).

Security is relevant for a wide range, if not all, companies, while safety is most relevant for the industry and transporting sector (“heavy” safety, not SHE). For a store or a consultant company, security will be more important than safety.

Everybody deals with security in some way – e.g. locking your door is security. “Security holds a mirror up, not to nature, but to society and its institutions”, reflects the aspect that humans, as members of society and institutions, are what we are protecting us from. Concerning environmental factors in the surroundings of the individual is also important.

3 Summary of comparison

3.1 Similarities

The basic ideas of industrial safety and security are the same; both are protecting assets from hazards/threats creating safe/secure conditions. Nevertheless, there are some nuances that distinguish them. By taking these nuances into consideration it is possible to coordinate security and safety management. In addition security management can learn from safety management, especially on the field of organisational aspects.

3.2 Differences

Differences between security and safety is presented in table 1

Table 1 Main differences between security and safety

	Security	Safety
Causes	An incident is most often a result of one person or a group's will	An incident is most often a result of human behaviour in combination with the environment
Causes	Often planned actions	Often unplanned
Causes	Criminal acts	Criminal acts (Working Environment Act)
Causes	Mainly malicious acts	Seldom, if ever, malicious
Causes	Mainly deliberate acts with a wish of a wanted output/consequence of the act.	Mainly deliberate acts without a wish of a wanted output and accidental incidents
Threats/hazards	External and internal human threats	Internal human threats
Threats/hazards	Threats are not always observable, tangible and proximate	Hazards are observable, tangible and proximate
Loss	Loss is mainly related to physical assets and information	Loss is related to human injuries/death and reliability of industrial assets
Surroundings	Reflects the state of society through its structures, economical situation, law-abidingness and moral	Includes physical and environmental conditions – not only humans and society
Relevance	Relevant for a wide range of companies	More relevant for the industry and transporting sector
Uncertainty	High degree of <i>uncertainty</i> and low degree of knowledge about threats within	

4 Security

Based on the discussion above, a possible definition of security might be:

A condition of being protected against planned, malicious and criminal incidents from a wide range of threats, where what is protected is all kinds of values to an organisation/individual and incidents happen due to the wish for a wanted output/consequence for the attacker.

5 Conclusion

The paper has discussed similarities and differences between safety and security, they are both about protecting assets from threats/hazards. The main differences found in the discussion is shown in table 1.

The discussions of security and safety has lead to a possible definition of security.

By taking the differences between security and safety into consideration it is possible to use safety management strategies in security management as well. Coordination of security and safety management is possible

6 References

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