Safety Culture, Leadership and Enforcement

MJV – September 2015

Safety Culture

Survey Background

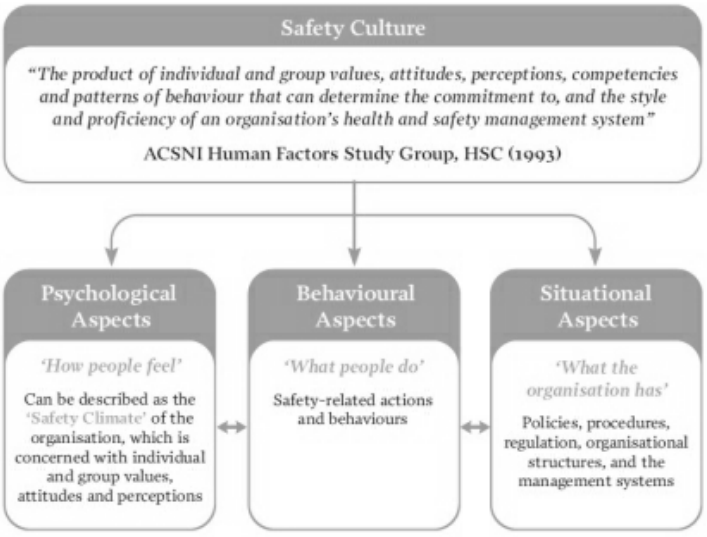
The European Process Safety Centre (EPSC) has been invited by the Technical Working Group on Seveso Inspections to organise an awareness and opinion survey on safety culture and particularly how this concept relates to major accident safety. The target audience of the survey are individuals within the broader process safety community who work for operators, regulators, universities and local, national & international agencies.The results are to be presented to the Mutual Joint Visit (MJV) meeting to be held in September 2015 and hosted by the Dutch authorities. Respondents who choose to will receive an analysis of the results as soon as possible after they complete the survey.

Safety Culture

Definition

* 1. Have you previously come across the illustrated definition of safety culture shown below?

- Yes
- No



* 2. How clear is this definition of safety culture?
(1=low, 5= high)

- 1
- 2
- 3
- 4
- 5

* 3. How useful is this definition of safety culture? (1= low, 5= high)

- 1
- 2
- 3
- 4
- 5

* 4. Is there anything missing from the definition?

- Yes
- No

If Yes please elaborate

* 5. Does this definition still have validity?

- Yes
- No

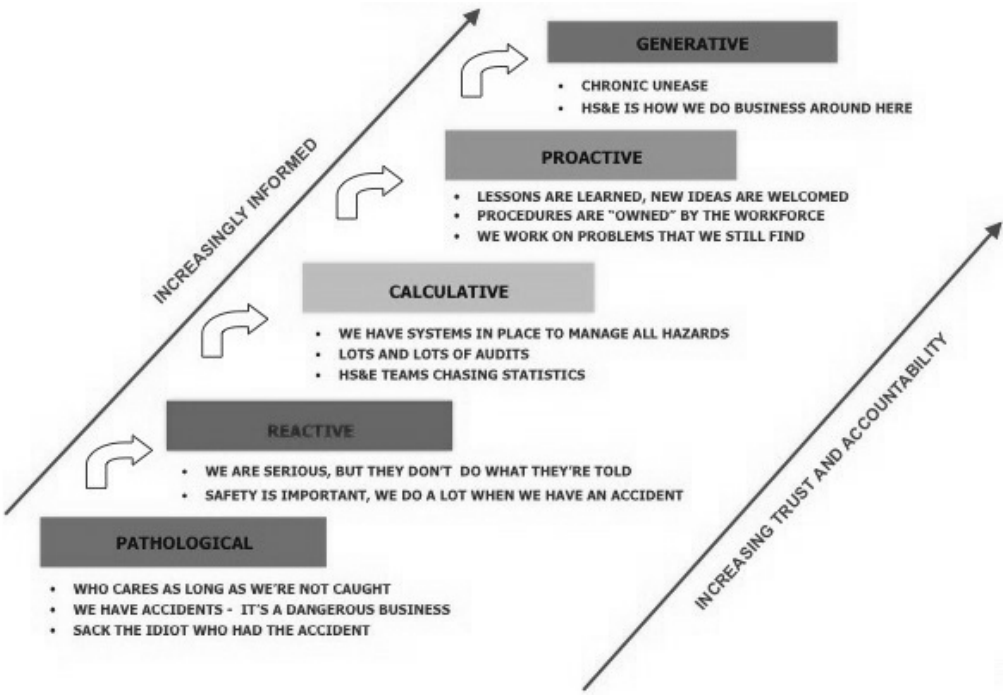
If No why?

Safety Culture

Journey

* 6. Have you previously come across the safety cultural journey as illustrated?

- Yes
- No



* 7. How clear is the safety cultural journey to you?

- 1
- 2
- 3
- 4
- 5

* 8. How relevant is the safety cultural journey to you?

- 1
- 2
- 3
- 4
- 5

* 9. Is there anything missing from the safety cultural journey?

- Yes
- No

If Yes please elaborate

Safety Culture

Safety Culture & Major Accident Safety

* 10. How clear is the concept of the safety culture within the realms of major accident safety? (1=low,5=high)

1 2 3 4 5

* 11. From what you understand to what extent did the influence of safety culture play in the following accidents? (1=low , 9=high)

	Can't really say	1	2	3	4	5	6	7	8	9
Bhopal (1984)										
Chernobyl (1986)										
Challenger (1986)										
Columbia (2003)										
Texas City (2005)										
Macondo (2010)										
Buncefield (2005)										
Toulouse (2001)										
Seveso (1976)										
Piper Alpha (1986)										
Enschede (2000)										
Ghislenghien(2004)										
Herald of Free Enterprise (1987)										

Please elaborate

Safety Culture

About you

* 12. Which country are you based?

Country:

* 13. How best would you describe the organisation you work for?

- ○ Major hazards operator
- ○ Regulator
- ○ Other

If other (please elaborate)

Safety Culture

Opinion1

* 14. To what extent do you observe major hazard operators developing and applying the concept of safety culture to their hazardous operations? (1=rarely/superficially, 5=constantly/deeply)

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Please elaborate

Safety Culture

Opinion2

* 15. To what extent are you encouraged by regulators to pursue a healthy safety culture in order to prevent major accidents?(1=rarely/superficially, 5=constantly/deeply)

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Please elaborate

Safety Culture

Opinion3

* 16. To what extent do you see major hazards operator and regulator working together to both improve safety culture and prevent major accidents? (1=rarely/superficially, 5=constantly/deeply)

○ 1 ○ 2 ○ 3 ○ 4 ○ 5

Please elaborate

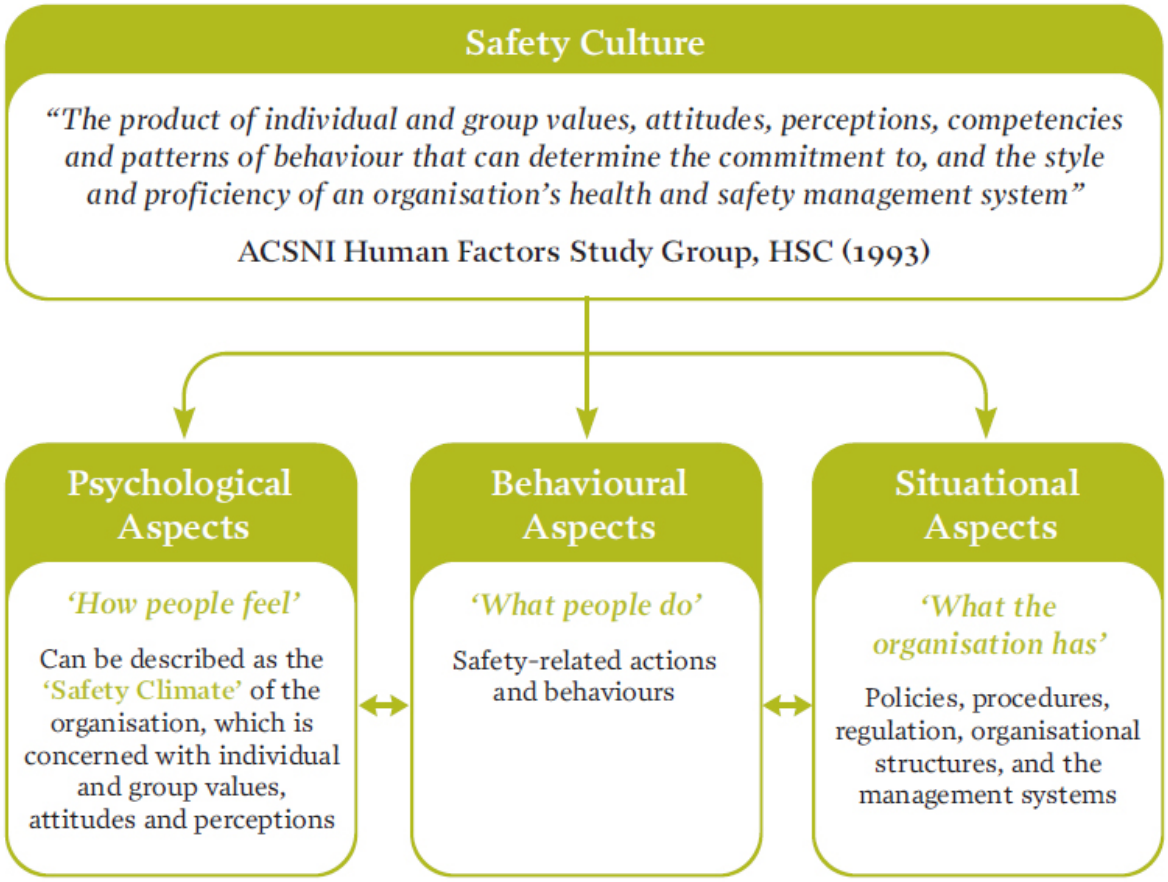
Safety Culture

Results

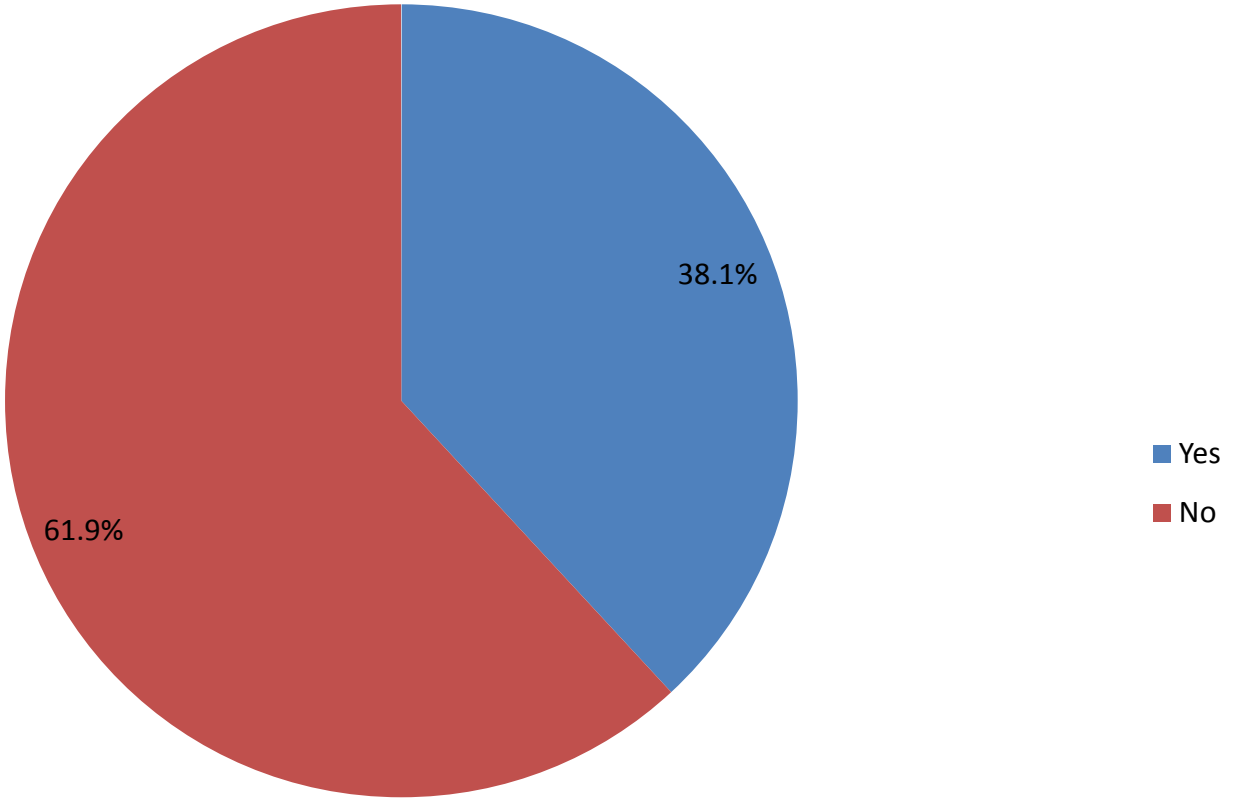
17. Many thanks for your time! If desired please leave your email address for sharing of results

Email Address:

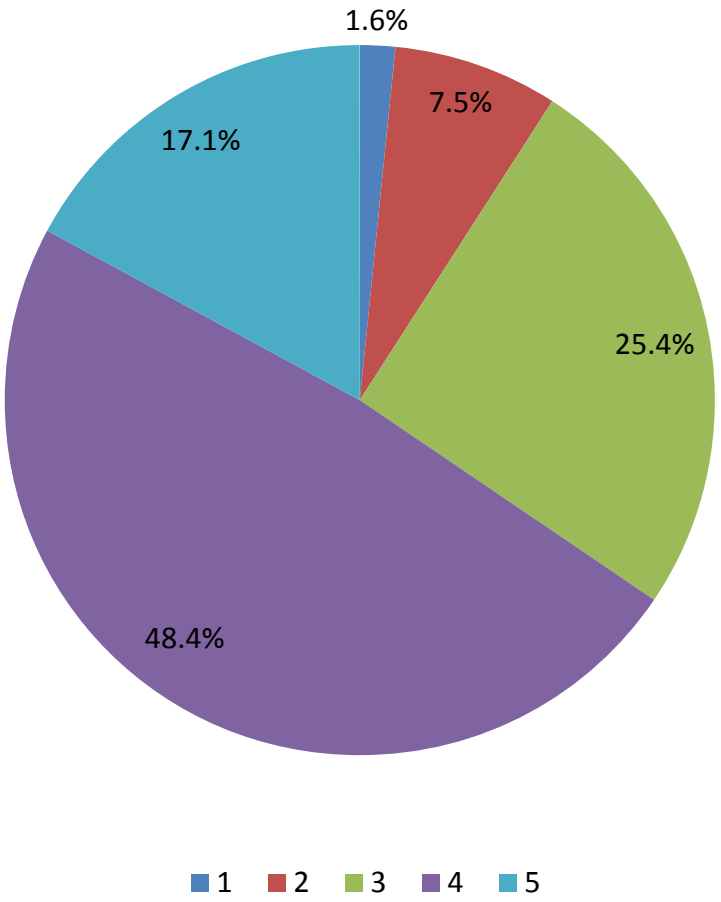
Definition of safety culture?



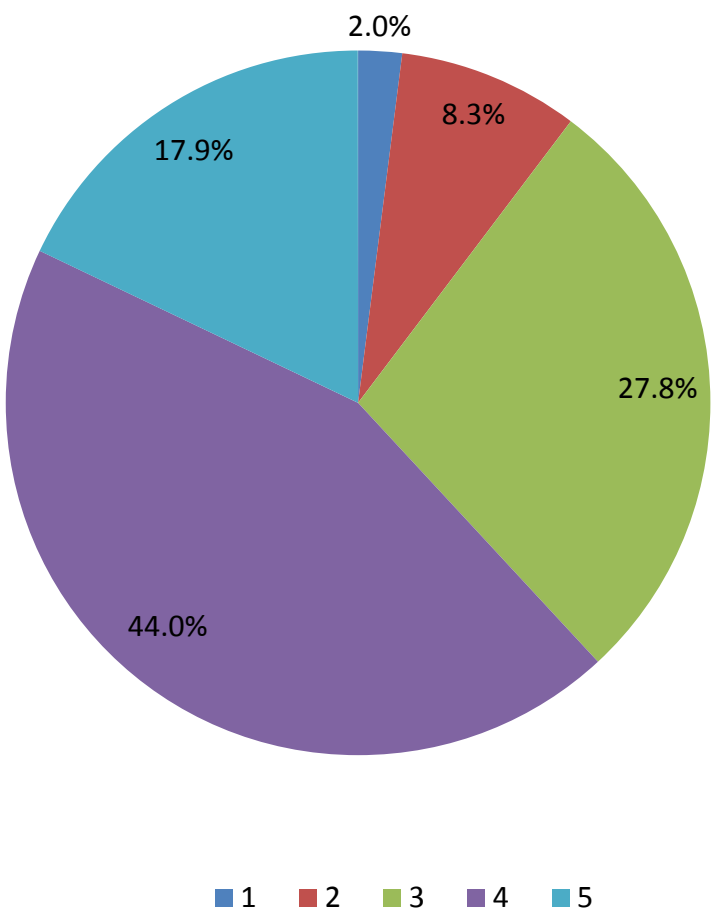
Q1. Have you previously come across the illustrated definition of safety culture N = 252



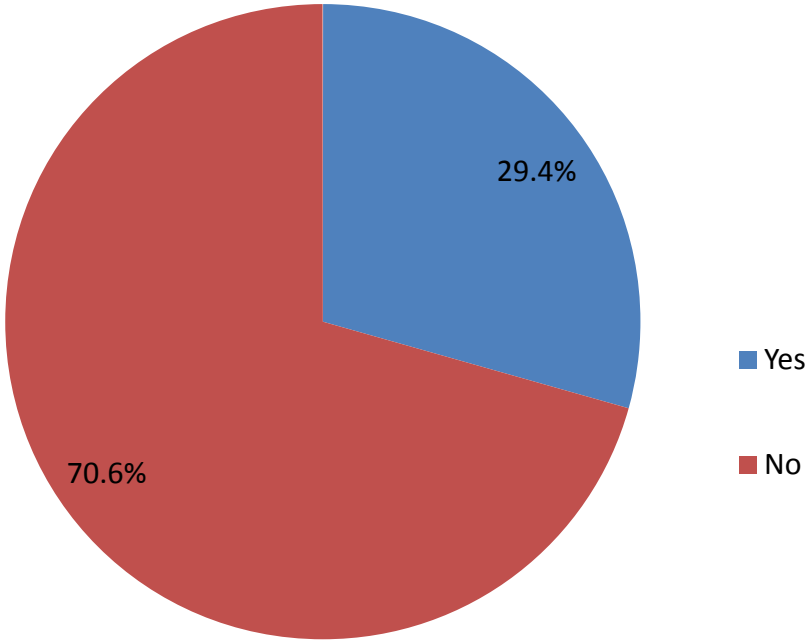
Q2: How clear is this definition of safety culture? (1=low, 5= high) N = 252



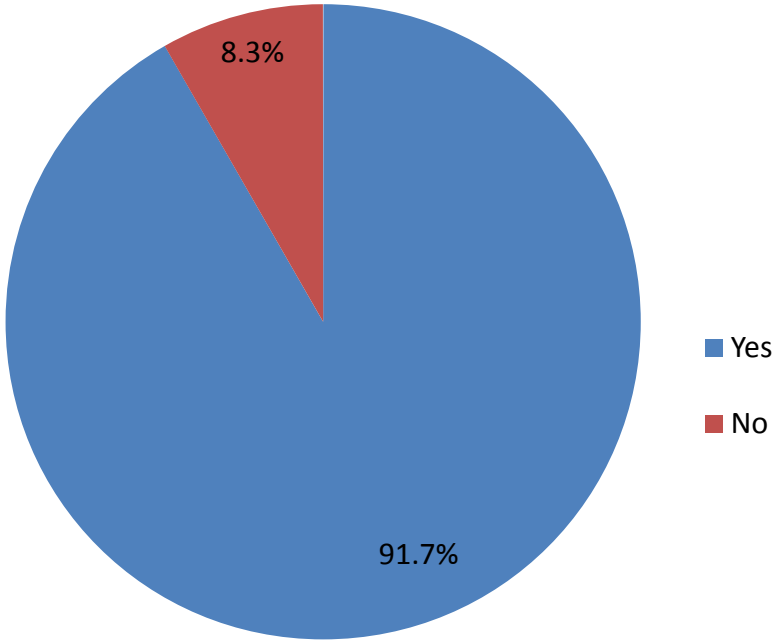
Q3: How useful is this definition of safety culture? (1= low, 5= high) (N = 252)



Q4: Is there anything missing from the definition? (N = 252)



Q5: Does this definition still have validity? (N = 252)



Is there anything missing from the definition? If Yes, please elaborate

Hazard Operators opinion

- Need to better specify the meaning of safety, what is safety, the prevention and protection from the risk, the concept of risk and hazard
- Variables are openly defined, which means that any analysis performed by a user will be determined to contain non analyzable aspects of safety, from the quantitative Point of view. How can anyone, from a qualitative model of variable Construction, measure safety aspects of high complexity organizations.
- More focus on commitment from management (including the CEO)
- I wouldn't know how to state it but peer pressure from unions, work partners. It is somewhat caught in the definition however peoples' desire to not be the odd man out, or, to actually stand out as a rabble rouser plays a role in site culture. We often blame a company for not creating a safety culture however the employees play a very large role in what they want to believe and accept
- Culture is more than just the sum of its parts (i.e. people's perceptions and behaviours). Rather it encompasses shared, taken for granted assumptions. This definition misses that.
- Something about importance of leadership and managements buy in and support.
- add convictions as an element of the product concerning individuals and groups, add level of development to the safety management system.
- In my opinion "WHAT PEOPLE KNOW" should be included as a fourth block. In industrial sites the experience and the knowledge shared by workers' community is very important too and it is in the shadow in the present definition. At major industrial sites this shared knowledge is a valuable resource for all technical issues, including safety.
- From blue collar point of view: no from white collar point of view: change management
- For the purpose of the Seveso Directive the environmental safety is missing. I guess this is not at least due to the age of the definition
- The assignments are unclear and missing links.
- Resource priorities for the organisation as an aspect
- The safety systems (ie SMS) are dependent upon behaviours - compliance by management and supervision or subversion of the SMS "to get the job done". The behavioural category needs to be clear who and what behaviour is in this box
- Simple language
- Safety culture also involves pervasive attitudes or beliefs regarding risk tolerance in the work place
- Communication and leadership are issues that are not present in the definition. There are four aspects of culture: philosophical culture (values, beliefs), ideological culture (such as conflicts of interest are resolved - associated organizational leadership) , communication culture (we say and what not, how we communicate) , culture material (as an organization is associated with the situational aspects described) . I believe that people behave the way that the context created by the material culture, philosophical, ideological and equipment allows or promotes.
- No
- Definition is a bit vague. Will be difficult to live by.
- It does not capture the relative priority of safety to other competing priorities
- Maybe Ruhe. Maybe the word processes
- It's fine as long as there are other items which can be used to evaluate culture. There are definitions, scales, frameworks, measurement methods, data sources, analysis approaches and improvement strategies
- The safety culture is how people will act at three in the morning when no one is watching.

- We need a crisp definition that includes the thoughts in this definition
- Responsibility on different level

Regulator Opinion

- This is the definition for specialists/professionals. A better definition would be more accessible to all people within an organisation.
- It will be rather hard to characterise because different companies are on different levels meaning that Even if two different companies describes themselves as working on safety question in the same amount and manor. But they start from different level from the beginning. You might get a answer that they are on the same level but that is not true.
- Maybe more in the situational aspect e.g. knowledge / awareness / training?
- Culture seems to exclude everything around the context where people complete normal work.
- The definition above is not clear.
- The important role of the top management behaviour etc is not very clear in the figure.
- Safety culture should be seen as a part of the organization culture at a business. The safety is influenced by psychological and social processes in interaction with the physical environment. A high level of security at a company are achieved when the safety culture interact with knowledge of the technical systems and the hazards of dangerous substance. It is difficult to measuring and following up safety culture of a company.
- The object of the commitment and the proficiency should rather be an output (result or values) rather than the HS Management system
- The safety culture does not only concern the organizations health and safety management system - which is rightly elaborated in the three sub-boxes. A bit misleading to write that the management system is the outcome as this can be seen as only the formal part of safety "situational aspects".
- Safety culture is in short what you do when none is watching
- Hard to tell, since I have not seen the Picture Before. I need to analyse it in detail,
- situational aspects should include technology and the wider business environment within which the company operates
- How it's developed and can change. Influence of leaders. Influence of external factors / organizational environment / circumstances.
- interaction with external organisations that can influence Safety Culture and the external motivators that can cause issues between safety and business
- The word 'product' does not feel too comfortable. Isn't it more a matter of cohesion or interlinked aspects which can be listed? A self regulating mechanism is as well an important aliment to safeguard a safety culture. The non existence of that will maintain a fragile safety culture.
- How the psychological and behavioural aspects interact and how leadership and communication influence the safety culture and climate
- In Behavioural Aspects - "What people do", we could add "What people do when nobody is looking". This add express the own behavioural without external interactions.
- Adaptive skills, knowledge of the different states of the system, and above all the links with safety performance.
- Two definitions which sound simpler to me: Safety culture reflects how people act when they work alone and nobody watches them. Or, mature safety culture means that people follow safety procedures because they are convinced to do so and not because they have to.
- Behavioural Aspects could include also how people behave in normal or abnormal circumstances.

- Environmental aspects
- It should be more clear, perhaps a bit more simple

Other Opinion

- Does not highlight individual expectations
- How we behave when no one is watching
- Expectations of individual, their immediate supervisor, their peers, colleagues; Clarity of and shared understanding of norms ('validity' / 'salience' of SOPs and accepted practices) Clarity and shared recognition of consequences (positive/neutral/negative) of behaviours and actions
- Openness, Learning from mistakes
- The "hardware" of the organisation (to what standard plants and equipment are built and kept) that forms the basis on which you can build your culture and work to improve it. If the foundation is not there then you should not start building the roof.
- I don´t have the time to think about what it could be
- Competence, leadership and design/engineering, should be mentioned.
- We try to focus on the difference between personal safety (so called hard hat safety) and process safety - this to ensure that we cover both areas thoroughly, and understand the difference. Focus within personal safety is to protect the person (personal PPE etc) while process safety focus on protecting the equipment (control functions emergency stops etc).
- Situational Aspects seems unclear. Organisational aspects is better
- External influence
- Environmental factors may influence safety culture? Major external events..
- companies ability to translate good safety work to share value
- Culture is a very difficult term to define. Use therefore common terms as described in e.g Wikipedia.
- The issue about the requirement (to achieve true "Safety Culture") of having a good leadership in each organisation striving for enhanced Safety Culture. Without good and visible Leadership in the organisation, where the safety Always is to be prioritized, you should not talk about having a real Safety Culture in its own right.
- Site leadership aspects. Two sites with identical "situational aspects" may have entirely different safety cultures because different way of the site leadership endorsing them.
- Safety performance (How we are doing, how many injuries, how severe etc)
- Under situational aspects, the company's economy may play a role
- Economical Commitment.
- Whilst it is technically and academically accurate, it seems to miss the large role that senior leadership have in setting the safety culture. Should include something on Reporting Culture. Also refer to Energy Institute Hearts and Minds material.
- The safety culture of the headquarters "far away" and the inspections (by headquarter, inspectorate) (Lenin!)
- It is not clearly defined to which persons / organisations / Stakeholders etc. safety culture is addressed
- It is too much academic and general

Does this definition still have validity? If No, please elaborate

Hazard Operator opinion

- Although predominantly valid I believe the Situational Aspects go beyond just what an organisation has. The situational aspect is a cumulative recognition of what we have, how they feel and what they could do based upon the situational situation. The current definition is not aligned to situational awareness and could generate confusion when both culture and situational awareness are brought together.
- Variables are openly defined, which means that any analysis performed by a user will be determened to contain non analyzable aspects of safety, from the qantitative Point of view. How can anyone, from a qvalitative model af variable Construction, measure safety aspects of high complexity organizations.
- Culture is more than just the sum of its parts (i.e. people's perceptions and behaviors). Rather it encompasses shared, taken for granted assumptions. This definition misses that.
- Additionally, it seems to imply culture as a normative feature, i.e., that culture can be either good or bad. Culture is an adaptation to a given environment and therefore cannot be described as good or bad in that sense.
- As I've said in point 4 the knowledge (I mean the technical knowledge) is not adequately considered.
- In principle it is okay but rather basic. It does not seem to be complete and the latest state of art.
- Wording such as "style and proficiency of an organisations health and safety management system" is too esoteric to be embraced by all employees. Not to mention that most companies do not describe in enough detail within their policies and procedures, or other management systems, the specifics that encompass good safety culture. Some aspects are covered under a facility's management system like following company standards or regulations, but many aspects of safety culture are difficult to define.
- While it has appeal and some clarity, it is problematic in MANY ways. (1) First, it is described as a "product" implying a mathematical formula. Is this intended and has such a formula been tested? Are all components equally important as demonstrated by empirical data? (2) Second, each piece in the lower half is problematic as (a) it's not clear that "how people feel" should be limited to how they feel in the organization. (b, c, d) Further, "attitudes, values, and perceptions" are much too broad and vague to be meaningful. More details for each of these are needed (attitudes about what?). (e) How are individual and group data combined here? (3) Third, culture is NOT behaviour. This does not belong at all. (4) Fourth, policies, etc. need to be limited to safety and it's not having them but rather how employees perceived they are enacted.
- 1; The ordinary people are not aware of this 2, Only that companies with safety culture fit with it

Regulator Opinion

- Well yes to some extent. In many instances the term Safety Culture is used as a new name for human error. What about the organisation?
- Examples must be added to the definition.
- It is too abstract, too many words. It would be better with a more illustrational figure showing what safety culture is.
- Only part of the picture
- Safety Culture seems to be an "umbrella" word embracing too much concepts in its definition to be useful and operational on the field. We can assume there are several

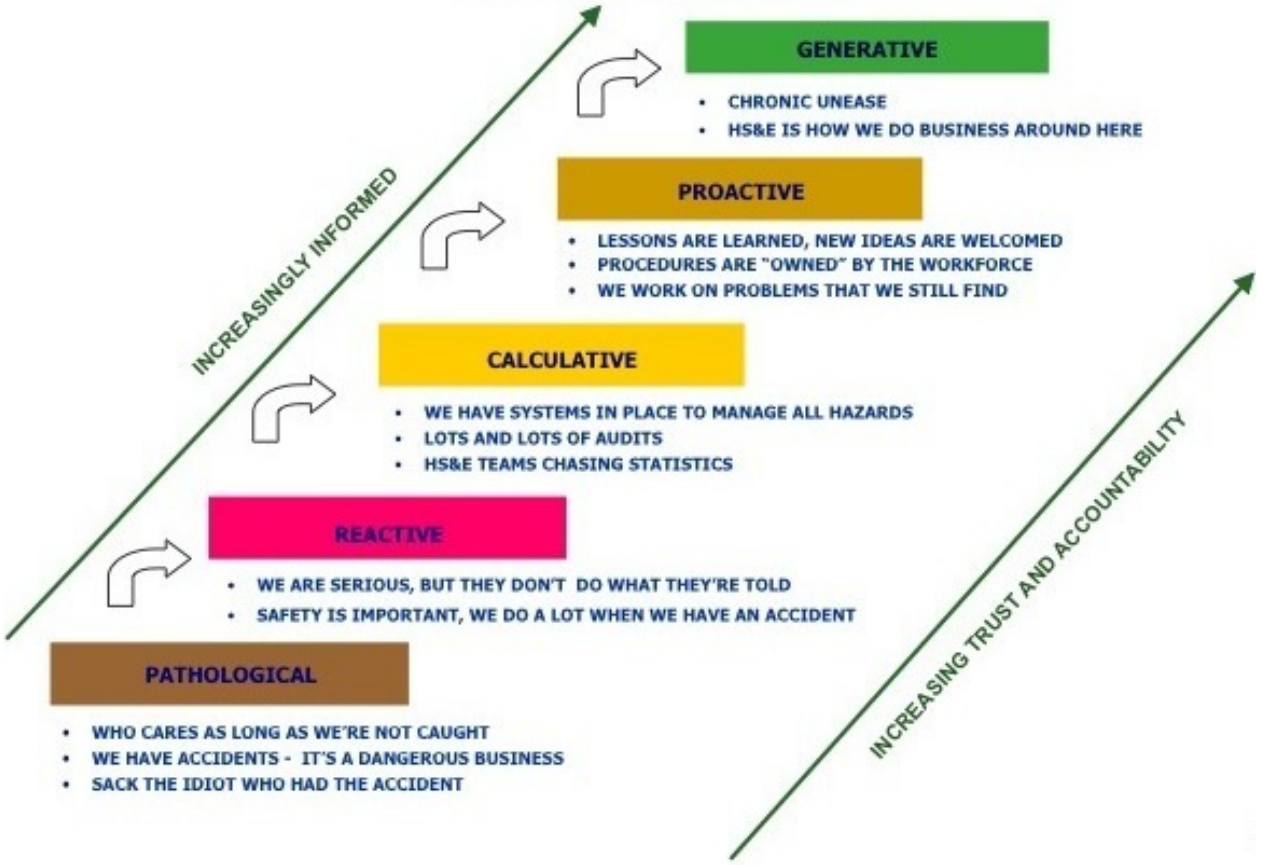
safety cultures in the same company. It seems difficult if not impossible to use this concept to improve safety.

- From a strict "safety culture" point of view the definition is ok, but the links with safety performance is missing. As a matter of fact, values are gathered thank questionnaire (risk perception), but how behaviours are identified, what is a good and a "bad" behaviour? And all organisation have procedures, structure and management system. The links with safety performance is missing

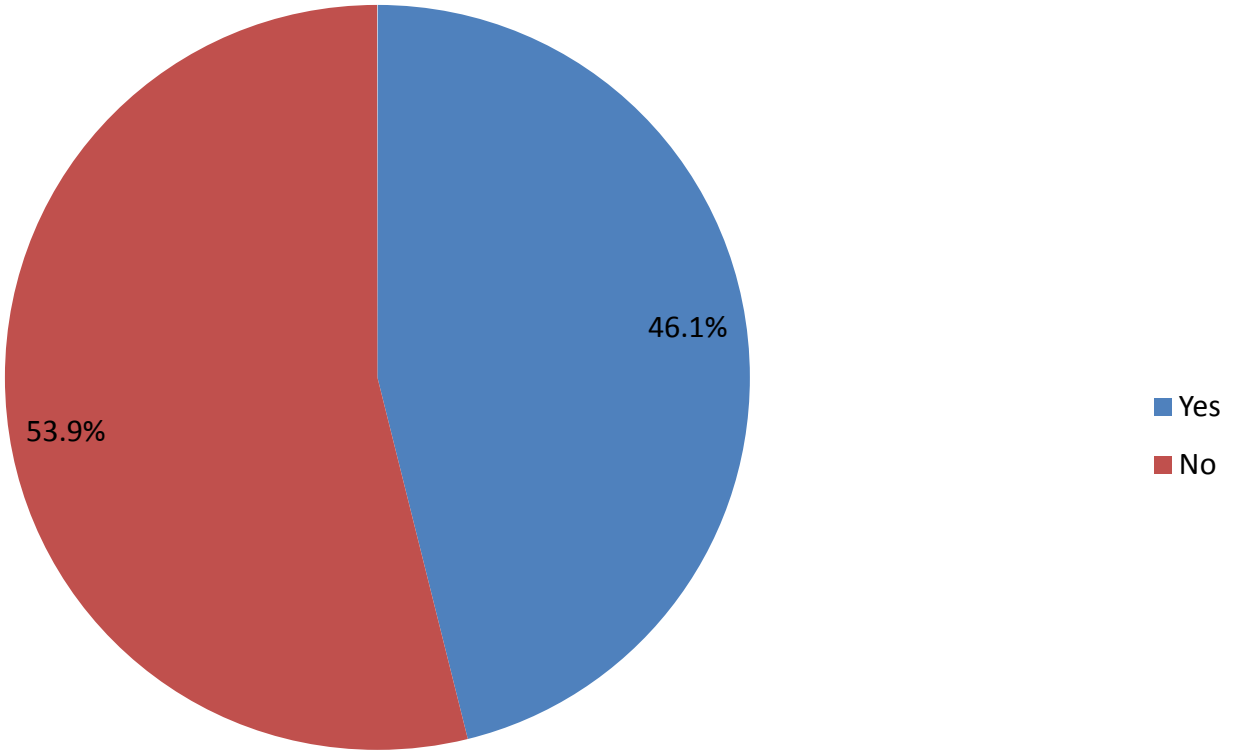
Other Opinion

- Somewhat
- The "hardware" of the organisation (to what standard plants and equipment are built and kept) that forms the basis on which you can build your culture and work to improve it. If the foundation is not there then you should not start building the roof.
- Partly
- English is not my mother language and a simplification should be sought.
- Sort of valid. Need to very clear for being useful. Need milestones (zero culture for example)
- It is still valid but see comments below about the importance of Senior Leadership. Also it feels a bit passive rather than something that actively highlights the drive to a better culture. Whilst it is technically and academically accurate, it seems to miss the large role that senior leadership have in setting the safety culture. Should include something on Reporting Culture. Also refer to Energy Institute Hearts and Minds material.
- The safety culture of the headquarters "far away" and the inspections (by headquarter, inspectorate) (Lenin!)
- Safety culture is an important object for future developments. For addressing this in an effective way to all stakeholders, definitions should be more actual. This means not that the highlighted Definition is not useful. Non experts ask if there are other definitions available.
- yes, the definition is still valid in general terms)

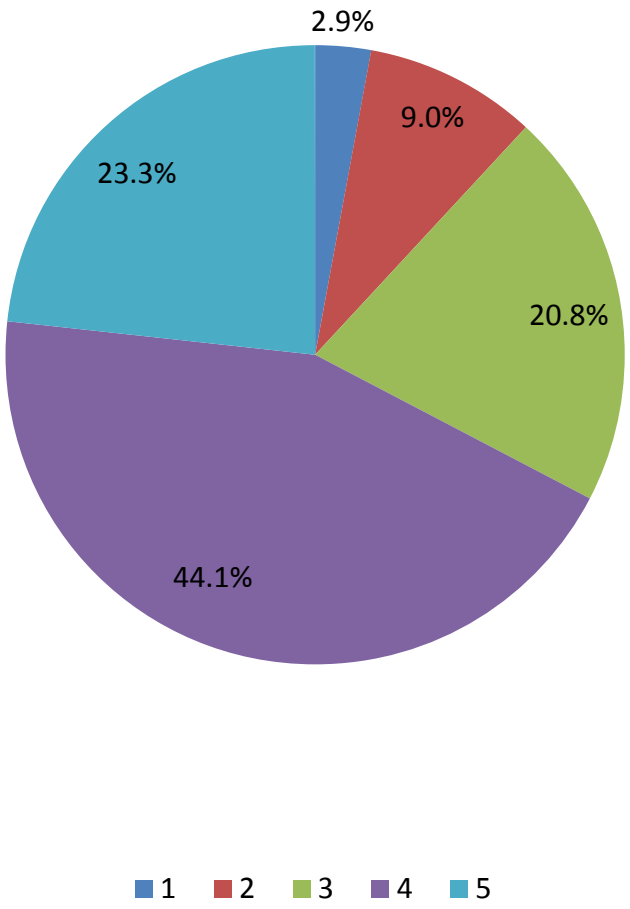
Safety Culture Journey



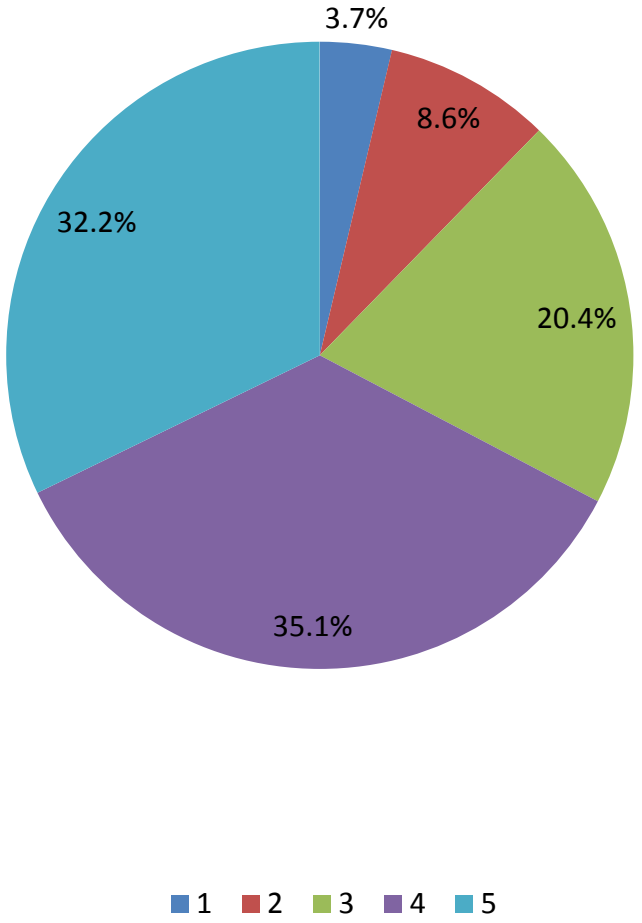
Q6. Have you previously come across the safety culture journey as illustrated? N = 245



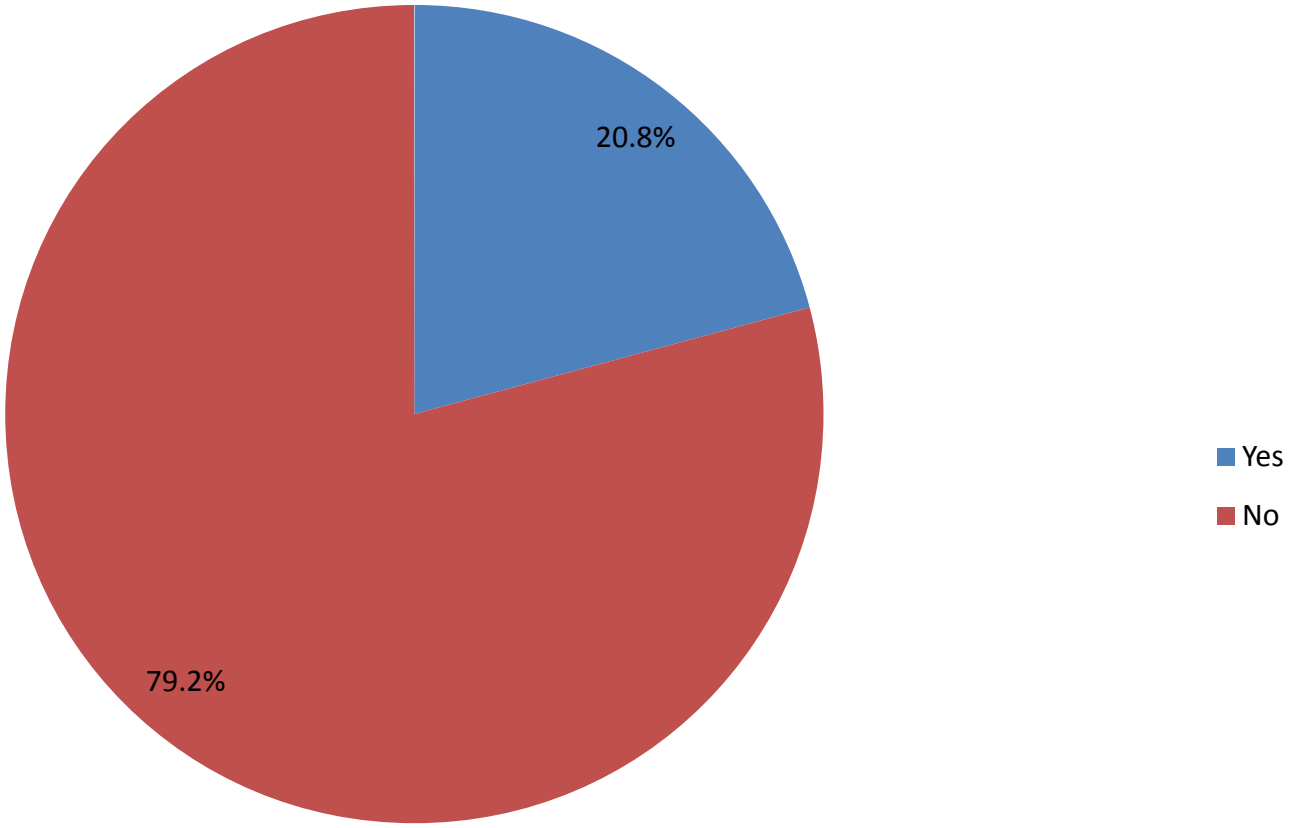
Q7: How clear is the safety cultural journey to you? (N = 245)



Q8: How relevant is the safety cultural journey to you? (N = 245)



Q9. Is there anything missing from the safety cultural journey? N = 245



Is there anything missing from the safety cultural journey? If yes, please elaborate.

Hazard Operator Opinion

- not clear the steps for managing the risk, from the risk individuation to the risk prevention
- From authorities point of view the model is of minor concern.
- Different groups of people can be in different places on the journey. Different areas of a chemical plant may be great and some are not. How can we show the leadership role in setting the direction? it doesn't just move up the rungs of the ladder but can move back down. I don't see where we discuss learning as a step.
- It's too linear, culture formation does not follow steps like that. Second, it completely sees culture as something inside the individuals, rather than as a reaction to a given environment. It's too simple.
- Replace "informed" by "aware" or "conscious" or add these words to it
- Resilience should be highlighted. The last phase generative is in same way "resilient", but that is not so clear.
- sustain the performance / sustain position
- Ease of understanding. too difficult to understand. use simple everyday language
- It's important to complement the ladder with process safety culture aspects, in order to include other aspects related with risks, normalization of deviance and others (see CCPS source)
- Difficult to understand
- Ned's Clarity Is missing
- By itself, it does not go far enough to enable evaluation of culture. There are definitions, scales, frameworks, measurement methods, data sources, analysis approaches, improvement strategies
- needs to be crisp and memorable
- Hard to say exactly what, but something making Generative more operational
- Responsibility

Regulator Opinion

- It is still all about human shortcomings and that people should try harder.
- The disadvantage of this model is that the different steps are described with subjective wording, which tend to increase people´s bias in self-evaluations. Too few would (like to) describe themselves as "pathological" or even "reactive" or "calculative"
- In the generative step it would be nice if also safety as a value was mentioned. This would relate to the building of safety climate and adds some positiveness to the figure
- Although practical and illustrative, it may falsely give a sense that culture is a linearly evolving entity, which is other not the case for an organization consisting of several sub-cultures, constantly changing dynamic environments, etc.
- It only defines organizational characteristics and the way an organization responds to what it faces. This can falsely stereotype; the response may depend on other factors.
- the potential for the degenerative stage - ie where complacency or poor managed change cause a degraded safety culture which is not recognised
- the knowledge of the good practices
- An evaluation and self regulating mechanism. It is important to continuously evaluate all steps and give feedback to the elements of the 'safety chain' (pro-action - prevention - preparedness - response - damage review – follow-up).
- It is a bit unclear since the bullets in mainly the pathological and reactive part are thoughts that are "bad" and should be left when moving upwards whereas the bullets in the proactive part are "good" and should kept when moving up to the highest level
- What it means in terms of organisation, communication, structuration of work. Are we sure that one culture is more efficient than another in terms of safety? Is there any

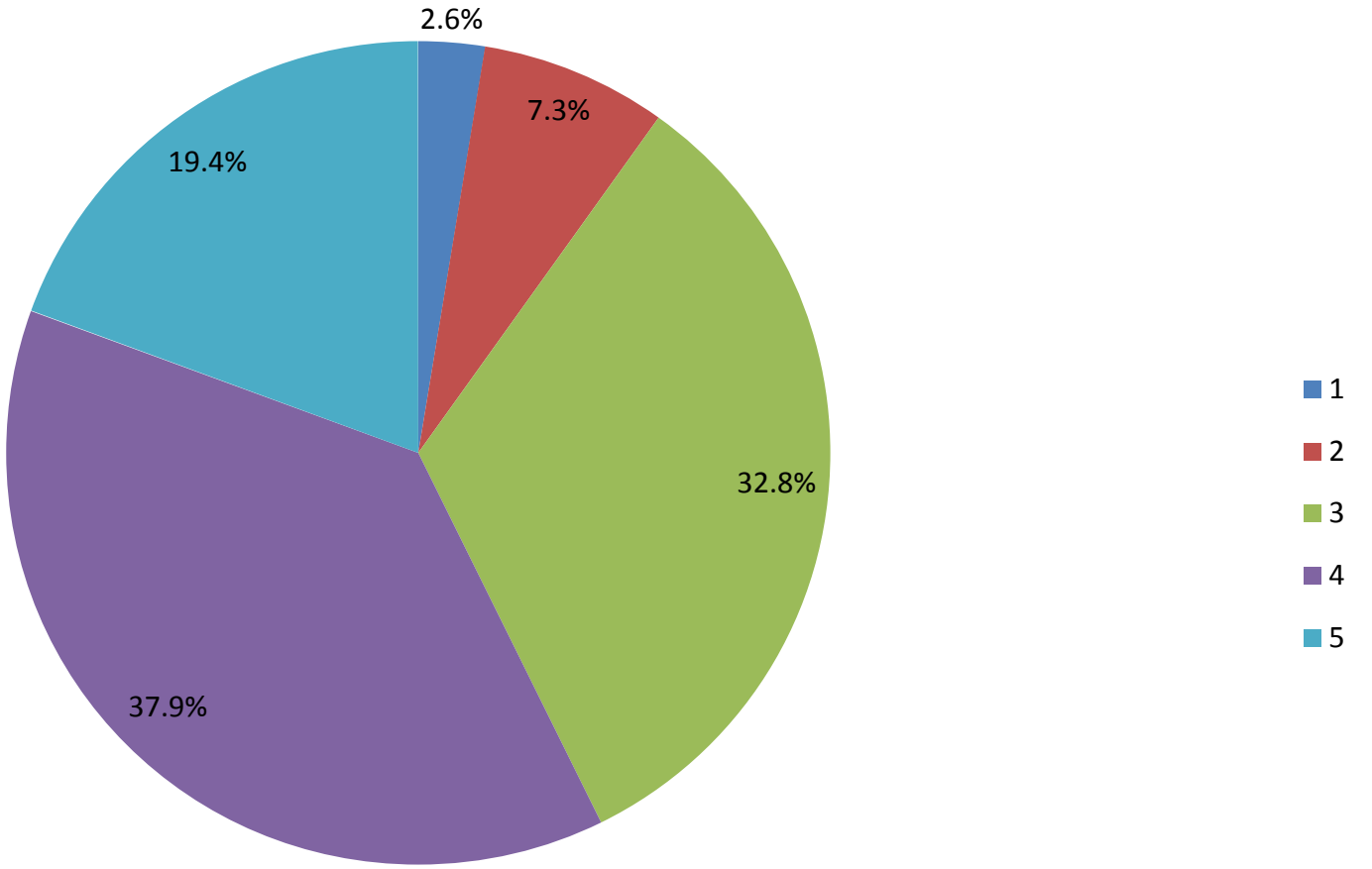
possibility for having all those 5 cultural types in one single organisation, depending on the working group, position, objectives of work. If yes, how to deal with this? Is it a problem? All those statements are very generic and do not allow to improve safety in every working day.

- The boundaries of one level from the next are not very clear. In some cases, it seems that the characteristics of two subsequent levels appear simultaneously in the same organisation.
- Generative should not be classified in such a way - chronic unease leads to mistrust of system thereby fear of having accidents rather than knowing the system and understanding of what you need to do to avoid accidents from occurring

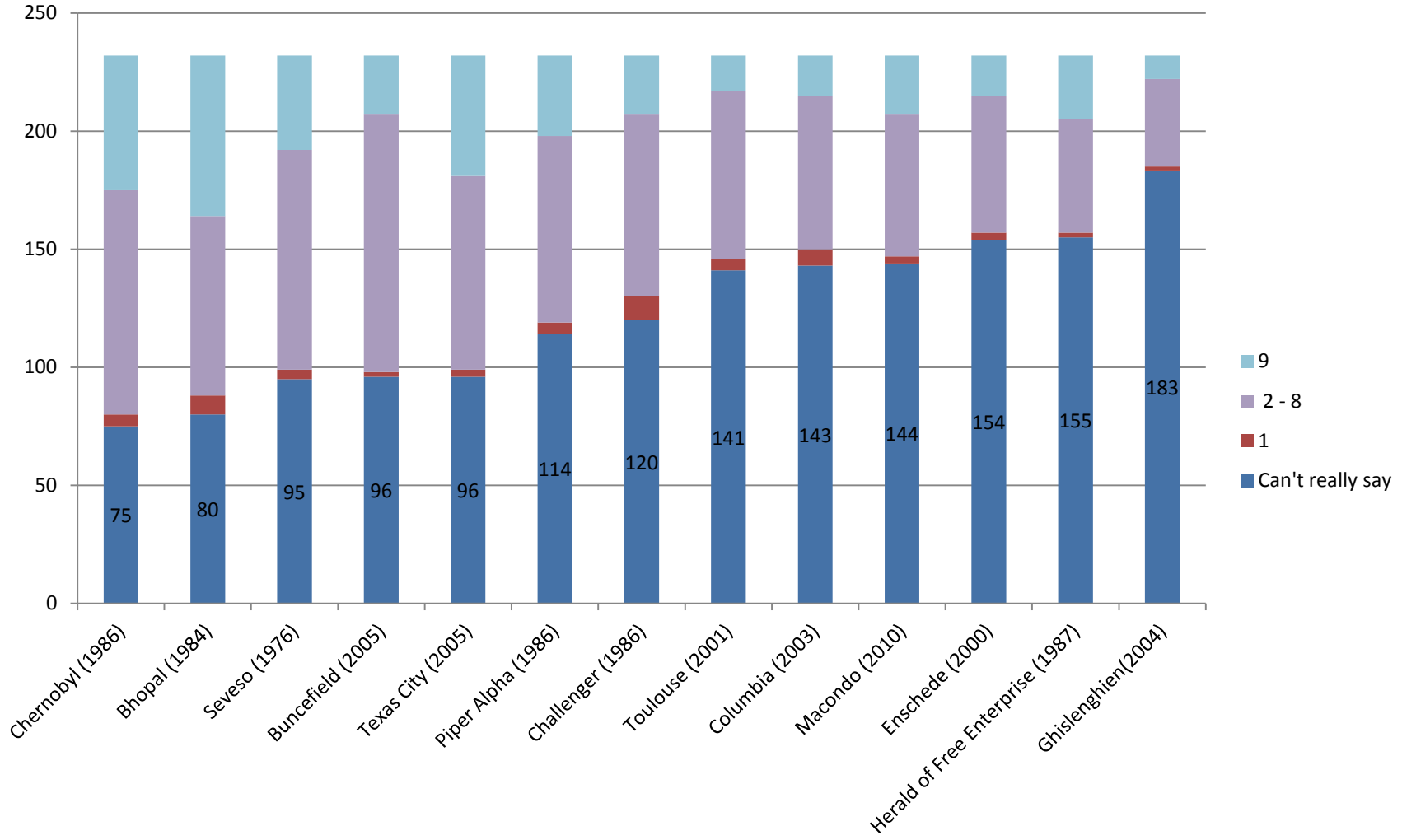
Other Opinion

- Learning from mistakes and near incidents
- The "hardware" of the organisation (to what standard plants and equipment are built and kept) that forms the basis on which you can build your culture and work to improve it. If the foundation is not there then you should not start building the roof.
- But the reality is not quite as stepwise as illustrated
- I have not seen this specific model, but a similar one including improvement tools
- acceptance of influence of external incidents
- It should be pointed out that the picture is illustrative but simplistic. In reality, most of the criteria (e.g. "We work on problems that we still find") can apply to any organisation to a certain extent.
- Companies ability to translate good safety work to share value
- Different persons and locations of a site can be placed in one or more of these steps at the same time
- Marking where you would expect to find a risk business with an approved security document
- There should be better concretized what is to be included in i.e. the top layer of this stair. Moreover the "Unease" feeling, as to be given as a driving factor, should be switched to some positive goals as well. The "Uneasy" feeling can be boosted by many other factors as well, and not necessarily just related to (lack of) Safety Culture, or the way the company operates. Here again, the Leadership should be explicitly mentioned since it have an important role in a successful "Safety Culture" (to have the Safety Culture to live on in the organisation). There are graphs (diagram) saying the same thing but are more clearly in the time perspective development phases. Do Not Forget the significance of the Leadership in this context!
- Safety performance
- A lot of things, for example: that you should prevention for accidents
- Need to stress that in a large complex organisation the different stages of the journey may be simultaneously present
- A practical use is missing. this is too academic
- Inspectorate
- The influence of the education/training it is not adequately taking into account

Q10. How clear is the concept of the safety culture within the realms of major accident safety (1 = low, 5 = high) N = 232



Q11. From what you understand to what extent did the influence of safety culture play in the following accidents? (1=low , 9=high) N = 232



From what you understand to what extent did the influence of safety culture play in the following accidents? (1=low, 9=high). Please elaborate

Hazard Operator Opinion

- Other important case of histories: been, pasadena, kallo…
- These all had varying degrees of application of the safety culture and without reading through each in depth the preference is to recognise that there was a failing in the safety culture in all of these as they had some form of multiple failing at varying levels of the organisation.
- Richtlinie 96/82/EG (Seveso-II-Richtlinie)
- It's easy to give a low score here, but I don't really know these accidents and their underlying cultures.
- Considering the definition of culture, all accidents are strongly influenced by aspects of culture. Practices and processes, communications and lack thereof, leadership styles and values experienced in the organization are generating contexts for accidents. The challenge is to make a correct diagnosis of culture. Issues related to compliance with the practices and processes (operational discipline) , normalization of deviance , communication , sense of vulnerability are some of the causes related to the culture that appears in the accidents listed.
- Detailed recollection of the circumstances for each of the accidents is not on top of my mind. For that reason not able to give meaningful scores
- Having safety protocols and not following them is useless Having not thought through safety is just as bad
- Many companies refer to learning from these accidents, in their internal safety culture development
- Piper Alpha initiated the Permit to Work Systems and improved the safety culture Offshore. Does not seem the Onshore Industrial have adopted the Offshore culture
- For major catastrophes, influence of safety culture problems can always be found. The safety culture in an organisation can be quite good, but if a major disaster happens, not good enough!
- Should the question be - influence of LACK of safety culture play. If the safety culture and understanding of hazards and systems where in place some may not have happened.
- This is a difficult thing to judge. By definition, multiple layers of protection have either not been present when they should have been or have proved ineffective. In either case, you could argue that this is driven by the values and commitment of the companies and the regulatory framework they were under - in other words safety culture is key to establishing and maintaining suitable layers of protection.
- I have not studied these incidents enough to have an opinion on this
- I have Heard about many of the accidents but not the analysis of them
- It seems that major accidents cannot be reduced further without a strong safety culture in every organisation.
- Chernobyl - operators did not have the culture to be able to object to wrong orders they were given due to culture of the time. Bhopal - maintenance culture was very weak and preventive maintenance was not thought of highly.
- I have no information about some of accidents listed above, for some like Toulouse it is no very clear

Regulator Opinion

- Safety culture in an organisation played a significant part in most of the major accidents I have an understanding of.
- Can only tell about the incidents I know

- As I know, most accidents in the past, even though caused directly by some technical faults, could be avoided or mitigated if a higher level of "safety culture" was present, including attention, knowledge, preparedness and so on
- Most major incidents listed above happened at a time when management believed everything was performing fine since the data they were using to see did not show any concerns (e.g., personal safety injuries were low, little use of stop work authority, it was routine for safety systems to be disabled and the plant still running).
- NASA accidents were deep in cultural issues, not adaptable
- Without knowing the details of these accidents I am convinced that they are caused by lack of management, bad maintenance instructions, lack of procedures. And lack of education of employees. About 90% of all accidents are caused by human behaviour
- For most of these accidents I do not have detailed knowledge, therefore the answers for some might be based on qualified guessing.
- My experience is that safety culture normally has a very important role in chemical accidents.
- I don't know enough about the actual organisations to comment, anything I know if after the fact
- I am not enough familiar with these accidents to evaluate the role of safety culture. However safety culture has always an important role (for example behavioural aspects).
- I don´t no causes of the accidents, just some technical facts

Other Opinion

- Very difficult to Elaborate. Not in the Position to judge about
- Culture impacts behaviour and beliefs at all levels and therefore will always have an influence. But it will not be the only influence of behaviour, nor even the most important in all cases.
- Safety culture must be a key factor, but it is not possible to weight it objectively because we cannot do a substitution test to see whether a good culture would in itself be sufficient. For example another option would be regulatory compliance,; had these sites had a weak culture but strong compliance would some of these incidents have been prevented?
- How clear is the concept within an incident? The concept/construct exists independent of any incident. Perhaps you mean how much is safety culture a factor that contributed to each of these incidents? This is how I interpreted the question, but who knows if other respondents interpreted it this way
- Misleading question. The lack of a sound safety culture contributed greatly to the incidents I marked 1
- Safety culture is an overlying way (environment) that affects the way an organization performs but not a root case of incidents by itself. It is the environment that allows the root causes to exist
- have not lead the reports in detail and cannot say
- Most of the "famous catastrophic accidents" were according to the investigation reports, had its root causes as for example the top managements lack of understanding of the consequences of the top managements own decisions (and its effects on the process safety etc.), or that the top leadership members did not knew (or disregarded requests of resources) the relevant facts about what was going on inside their own organisations. They should take the safety aspects in to account, or that they very well did know about the poor conditions but still maintained the enforcement of unrealistic or too harsh financial and economic Cost Control and Cost Reduction programmes that led to severely unsafe conditions over time. These and many other contributing (leadership-) factors were devastating in the wider context as the organisations were not given the appropriate operational mandate or the working conditions to operate in a manner that produced safe conditions at all times, or that

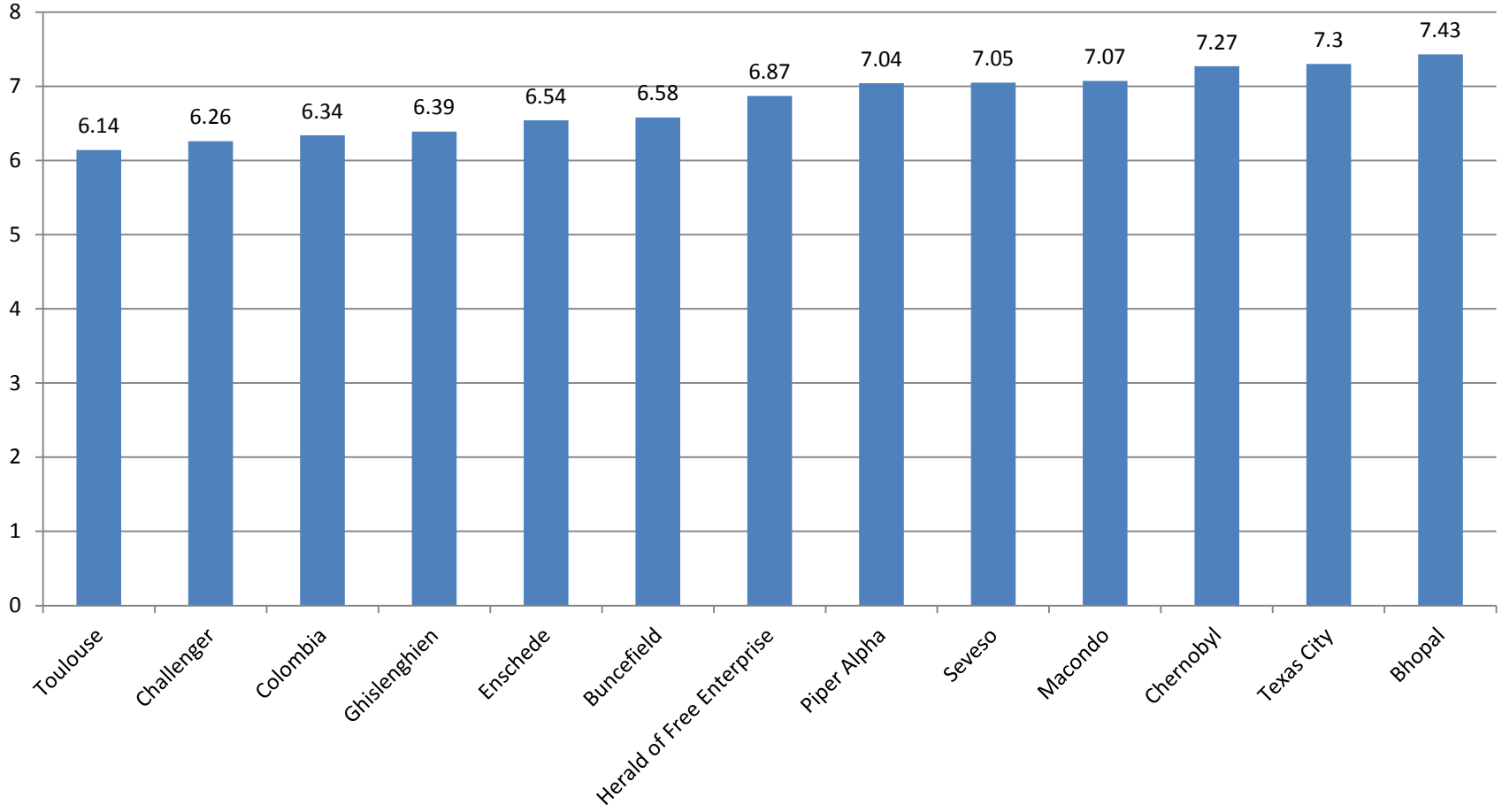
the consequences were down played by the middle management level as not to to jeopardizing their own careers (if they had any objections). These facts were put on the table and also that many inside the organisations respectively in fact DID UNDERSTAND and they DID KNOW about the insufficiencies but were not listened, in the it way required. This is a clear sign that the leadership lacked in each and every organisation, as to provide a so called "Safety Culture". Therefore, it must be underlined the significance of the well adapted "Safety Culture Mind Set" as to ensure that safety is not sacrificed for the benefit of bad decision politics to comply with pressure from the top decision makers (Challenger), or similar grounds, or ignorance or just old fashioned greed. Moreover, the top management in the organisations respectively (example are given in in Texas City Refinery, the Macondo incident and several other incidents) did also focus on the "wrong issues", that is to say more about slips, trips and falls, Lost Time Injury rate and such, but totally missed the process safety aspects, the real imminent risks, and the grim consequences of their failure in understanding the concept of risk in their own organisations respectively! To just look at injury statistics and from that believing that everything is in good order with everything else, is simply wrong! The managers need to be more educated about the risks in their organisations, the consequences about a serious accident and to learn about how to detect any "up-coming problems" in their own organisations respectively. In this context it is therefore necessary that the top leaders are required to be better at following the development and the overall safety performance (=not only LTIs and such) in their roles as decision makers. The dangerous thing here is also, that the top leaders do not grasp the fact that they DO HAVE A RESPONSIBILITY for the safety in their organisations, and they should not get away with having the benefit on just pointing at a SHE Manager or the plant manager as to say that they are the only ones having a responsibility for good safety standards and safety conditions to operate the site. The top leader certainly have a great responsibility to provide the right operating conditions (not be all focused on Costs etc.) as to ensure that no serious process safety incident occur.

- Many of the big accidents have happened and could easily be avoided. Because the knowledge around what could happen in the process or other was known and well understood within the company. These accidents happened only because the executives did not take the problem seriously and had personnel that caused the accident had lack knowledge and the right competes for the work that they were carrying out. If people lack knowledge how and why they should operate a machine or process etc. in a certain way. Then many people will operate the process or machine in the way that they find most convenient or effective. Even if the instruction say something else. If they do not understand why the machine or process is operated in a certain way because of safety reasons.
- If you have read the Diane Vaughn's book (Challenger the launch decision) it stands out clear that what when we talk about safety culture it is only a product of hindsight. People in the system were negotiating risk in the interface between the social and technical. Everybody was trying their best with the knowledge at hand to complete their job, their normal job.
- Safety Culture has an influence on all major accidents, and it is very difficult to rate any difference between accidents. In some cases the companies were too sure (or proud) of their safety systems (Piper Alpha, Texas City...). For accidents in 1970s and early part of 1980s one should note that the safety concept was not so well developed
- One might argue that safety culture influences everything - my scoring is based on the degree to which influenced the prime causes
- Organisational safety culture and the interactions between senior management with middle management and the influence of external organisations including regulators and government, leading to poor safety culture at the task level were major factors in all the events indicated.
- All these incidents gave an important impetus to evaluate, to learn and to change and improve. This had for sure the influence on safety culture. Enschede I was personally

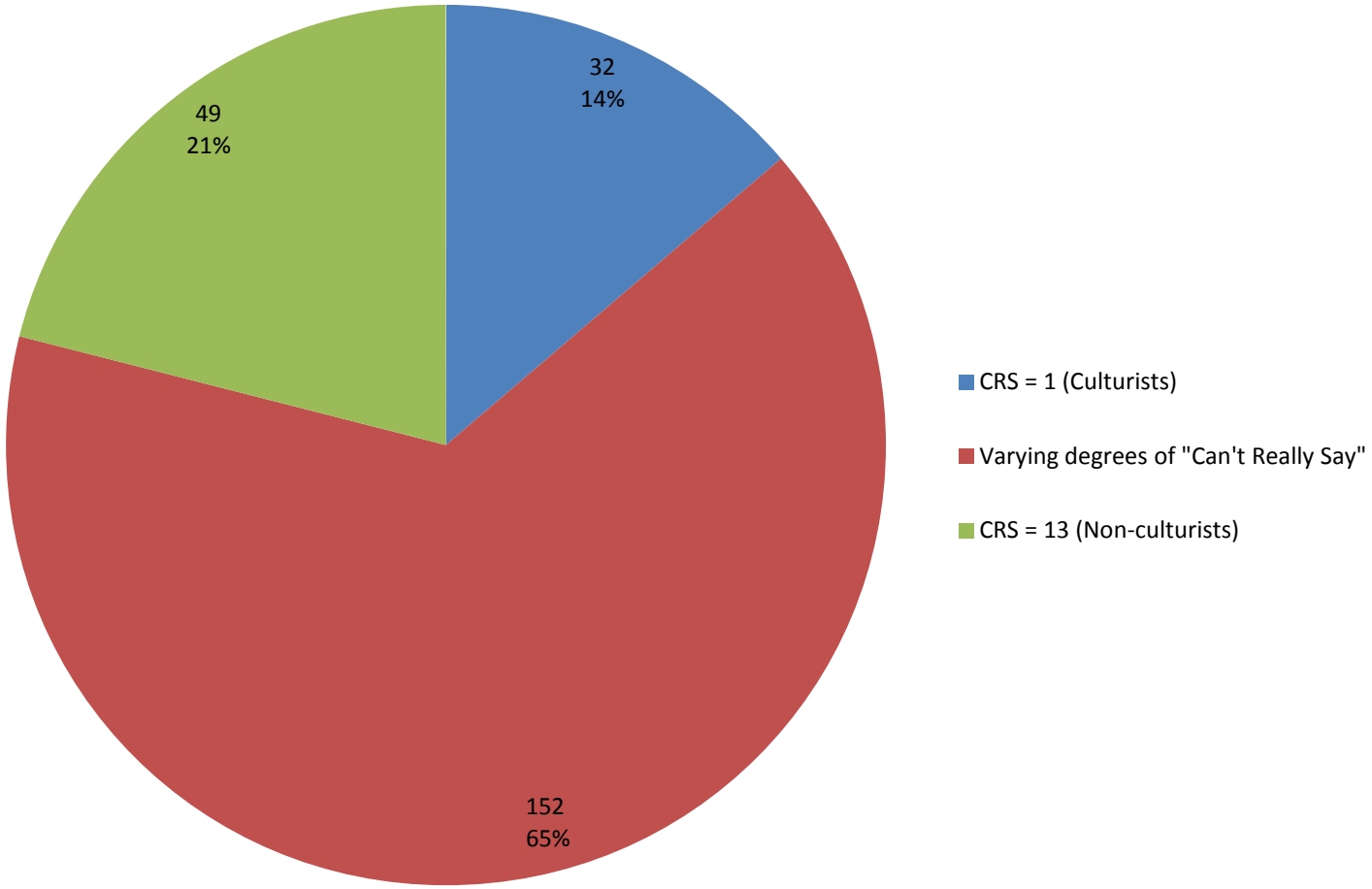
strongly involved in and was involved in investigations as well in improving law and related regulations.

- For each of those accidents, safety was claimed by the industry as a priority, with an official safety management policy. What it is important is the real life, the resources dedicated to safety, not the statement of purpose. One organisation can have a good safety culture, and under economical or other kind of pressure, make some wrong decision (at any level of the organisation). According to me, Safety Culture concept does not help to improve safety performance.

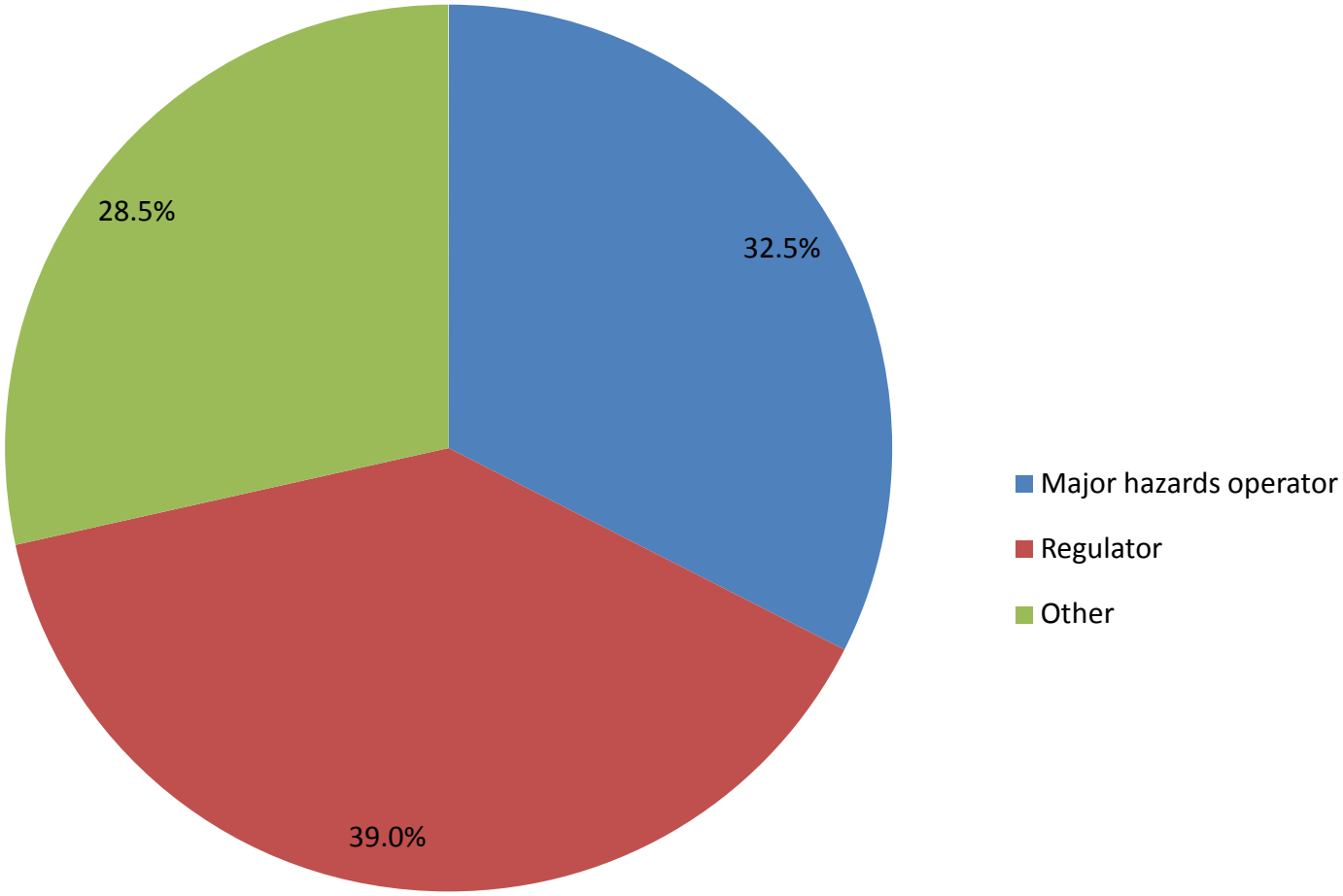
Weighted average of respondents rating safety culture discounting “Cant really say” (N = 232)



Breakdown of respondents "Can't really say"

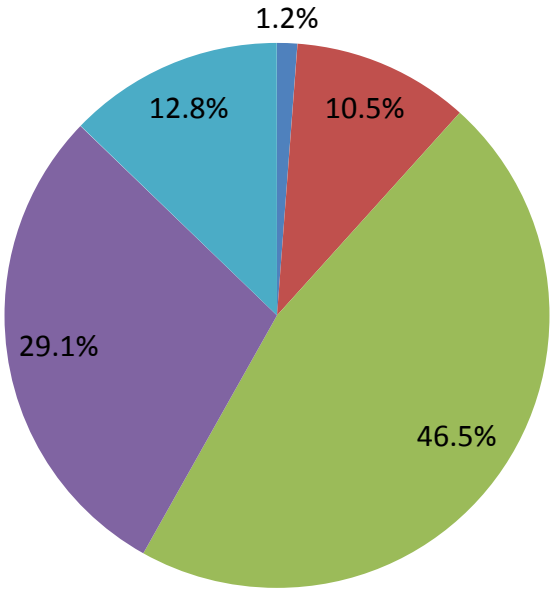


Q13. How best would you describe the organisation you work for? N = 228

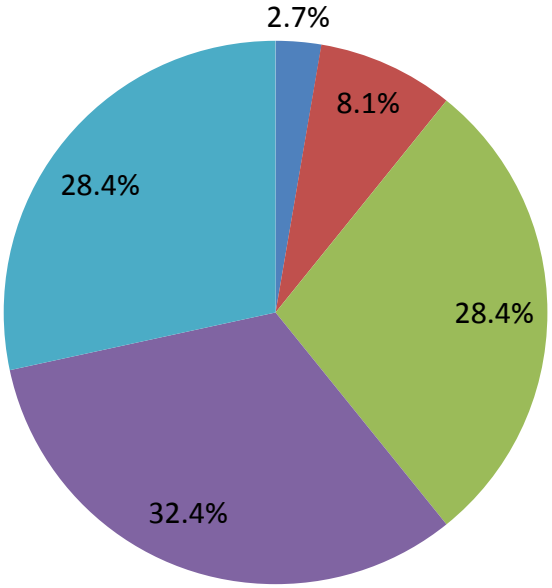


To what extent do you observe xxxxx developing and applying the concept of safety culture to their hazardous operations? (1 = rarely/superficially, 5 = constantly/deeply)

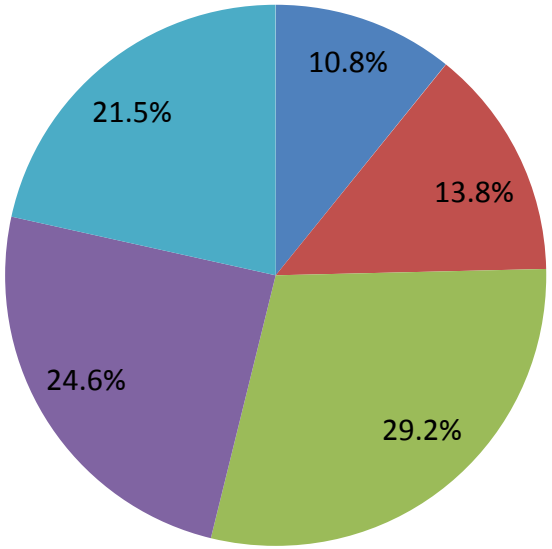
Regulators on Hazard Operators



Hazard Operators on Regulators



Others on Hazard Operators/Regulators



1 2 3 4 5

To what extent do you observe major hazard operators developing and applying the concept of safety culture to their hazardous operations? (1=rarely/superficially, 5=constantly/deeply). Please elaborate

Regulator Opinion on Hazard Operators

- In most cases major hazard operators understand the importance of a developed / good safety culture and the benefits of this. Generally they are working towards achieving improved safety cultures. Of course this is often due to learning from incidents and pressure from the major hazards regulators.
- Improving, but poorly understood. Operators are more willing to address this issue but lack the necessary competence.
- Not fully developed culture. It is seen as regulation.
- Just a few major companies are working well for developing safety culture in their organization. Small and Medium enterprises don't care safety culture. (that is a trouble as most Seveso plant in Italy are owned by small companies)
- Within the jurisdiction where I work, Contra Costa County in California, petroleum refineries and chemical companies are required to periodically perform safety culture assessments and act on those items found to be deficient. More emphasis has been placed on monitoring leading versus just lagging process safety metrics and facilities are doing a much better job at maintaining a sense of vulnerability. Elsewhere in the state and nation, less emphasis is placed on safety aspects of the job versus production.
- medium quality; connections missing
- I can´t tell
- My experience is limited to the multinational pharmachem industry
- Procedures are okay, but implementation is difficult. Every day leadership in all departments is necessary
- In certain sectors, primarily the Pharma sector very much part of the operations
- It is not yet an established practice, especially in small establishments. The major difficulty occurs in instilling the necessary awareness among workers and their participation in the improvement and risk reduction
- Safety culture is a part of our inspection programme, but we don't use this title. Instead we use management and personnel commitment. We observe safety culture by questions for management and by observing personnel during audit walk.
- It depends on type of operator. Local (only Polish) operators usually apply safety culture to fulfil minimum requirements. International consortiums located also in Poland have better understanding of safety culture in the process.

To what extent are you encouraged by regulators to pursue a healthy safety culture in order to prevent major accidents?(1=rarely/superficially, 5=constantly/deeply)

Hazard Operator Opinion on regulators

- Argentina has a few regulations and not much control.
- Also encouraged and audited within the company to have a healthy safety culture
- Regulators are focused on what can be measured and documented: Procedures, registrations etc. It is tough talking about culture
- Regulators are more focused on documentary evidence than sustainable behaviour changes and measurements or demonstration of culture. This focus prevents regulator visits from inspiring a deeper improvement.
- Our interest on safety culture improvement derived mainly from major accidents investigation reports such as Texas city 2005 and lesser from regulators.
- It is really appreciable that some of local authorities are working in close cooperation with major hazard operators for betterment of the safety at sites and increase of safety culture and populate best practices. There are few of regulators not so active in that direction and due to fact the score is not maximal.
- Having discussions but little pro-activity from them
- We are mostly encouraged by internal motivation and the company policy. We would like to see us self as world class when it comes to safety - that is our company's strongest motivation
- Regulators are generally well aware of the concept of safety culture and do promote it, but at least in our industry, their supervision (inspections/audits etc) is not sufficiently thorough to make qualified assessments of the safety culture and prescribe actions, unless there are very obvious problems
- Safety culture is not commonly used, but a risk based approach is more used.
- Our regulator makes frequent inspections (over 20 per year). The regulator tends to focus on specific aspects by discipline. This helps to ensure suitable layers of protection. I do not recall many specific interventions related to safety culture. Our regulator prefers to think about Leadership but this is also quite a vague topic.
- Annual Inspections

To what extent do you see major hazards operator and regulator working together to both improve safety culture and prevent major accidents? (1=rarely/superficially, 5=constantly/deeply). Please elaborate

Others opinion on Regulators/Hazards Operators

- The relationship between operators and regulators is often one of "what do we have to do?" rather than "what can we do?" Regulators are not seen as a resource for continual improvement but as a side effect of doing business that simply must be dealt with but doesn't add a lot of value
- Unlucky question. This implies that regulators would have a mandate to "regulate" safety culture. Do you mean "regulator" or "implementing authorities"?
- In the US, very little. (CSB is not a regulator). OSHA and EPA do thinks that focus companies on avoiding compliance penalties rather than doing the right think (improving safety culture and PSM effectiveness)
- Government and industry must be aligned to improve process safety performance..

- I believe that working with hazardous you learn a lot. If people that regulates buy them self it does not work because they might put up rules so that the work cannot be done and then the operators needs to break the rules to do their work. This is a way Executives on big companies work sometimes. That means that is something would happen it will always be the operators fault. The executives will not be accused if there will be an accident.
- Too often quick fixes and keeping up appearance
- Answer related to situation in Sweden
- Has to be both, collaborative approach, not just enforcement
- UK HSE endeavours to influence the way in which major hazard operators address process safety issues, but largely within the boundaries of COMAH
- Mixed picture due to issues with sharing information. Less problems in Nuclear industry
- I am confident that cooperation between the industry and the regulator is utmost important. However we need to keep in mind that both have the own and also unique responsibilities in their area. We should however not forget that regulators are even legal accountable (as well) in cases where they are aware of unsafe situations (through inspections) with a potential risk of an industrial accident. In the Netherlands we had an important court ruling where this was clearly pointed out. I wish to share an article that I have been writing where I shortly describe this topic: http://inece.org/conference/9/proceedings/40_Dijkens.pdf
- Depends a lot of the persons profiles in interaction. It can be very efficient locally (5), but 2 in average
- One challenge is that the authorities has limited resources and cannot support the industry as they like
- Cooperation with the Industry in general terms could be and should be much more improved and developed (networking). It would be excellent if the Industry and the regulators are in the future working together much more closer in i.e. listening in on the real needs and the full view of the consequences of each new legislative requirement(s) imposed to the industry. Especially on the way the authorities are working with i.e. the EU legislation, the participation on Working Groups for coming legislation in Brussels, or in how they develop requirements on the way safety or environmental standards are to be regulated and given in a commercially driven High Hazard Industry Organisations as a whole. Today it seems like the employees and the managers inside the authorities regulating high hazards industry do not want to hear in their view "uncomfortable truths" about the ways things really are working or about the ways the authorities are expecting things are operating (it is ineffective, do not want to have too much contact with industry etc.). As of today, several of the

responsible authorities seems to be reluctant to "let in" more closely those views or experiences in their ways of doing things, as to prevent these views to too much contradicting their already established way of thinking and doing things, and what they already believe they "know". This is probably to maintain "Status Quo" on influence on working methods, which effectively eventually enhances the Authorities shortcomings. The authorities needs to learn much more about the operating and competitive conditions the industry in Sweden or Europe as a whole are forced to operate under. many serious mistakes should be and could have be avoided if there wasn't so many poorly performed consequence assessments from a specific regulation in view of the effects for the industry both in a national as well as an international (globalized market) perspective etc. Rules and regulations should be more carefully implemented in the EU as to not harm the whole economy. We in the EU already have too many too complicated rules and Directives, regulations etc. Big issues certainly, but crucial for the maintaining of a prosperous economy as a whole, in which the authorities are definitely also a part of the problem. Another example. The Swedish authorities regulating hazardous industries activities do not dare to take decisions about allowing risk criteria in risk analysis context(s) in to their regulations. Risk criteria should be allowed in legislation as to have a better understanding and clearer guideline level on how good some conditions in risk terms really are, or to assess the safety measures in its own right, in each type of hazardous industry or activity. The authorities seems to know best for themselves, shows a little bit too often an reluctant view of taking in the industry's participants in decision makers groups that is not already are known to share their pre-set views on how thing should work. This is maybe done by habit, or by lack of insight, without actually having any own experience of how things really work in the industry or the globalized competition what so ever. The authorities also seem to have little interest to consider opinions that do not align with their own (lack of) experience. They prefer to employ only young junior people without previous industry experience from the field of expertise they are working with, of purely cost reasons etc. And so on. Much could be done here, as well as a lot of improvement can be made on the common results for the implementation of a smooth and efficient legislation in the safety and environmental side of legislative requirements.

- The process safety competence is not very deep and not widely spread among the authorities and therefore the requirements are vague.
- Bordering to a 4. Most often economical aspects weigh very heavily on decisions. Regulators are not really that interested/knowledgeable about the business to be able to improve hazards operator's culture/risk prevention.
- Major hazards operator stays responsible to improve safety culture and prevent major accidents, regulator can only help and advice.
- In Germany are no clearly defined competencies for this issue. German KAS (kas-bmu.de) is only writing reports which are mainly general and not useful for practice and individual cases. Important is a clear understanding of the industrial stakeholders. They must be proactive and share their policies as Basis for further Evaluations and discussions. Important role have competent authorities. They must be able to discuss with industry on a comparable Level. Good opportunities are inspections or public licensing procedures