

Damage, Measurement and Control of Cultural Resistance

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Abstract: The review of numerous Australian and International Transport and Health Safety cases has highlighted the detrimental effect of cultural resistance when engineers and regulators seek to improve transport safety.

This paper will define culture and cultural resistance. It will review a number of cases and provide an overview of the effect of cultural resistance, demonstrating some common characteristics of these cases.

A limited number of risk management disciplines will be reviewed as they apply to the problem, and highlight the value of expertise in these fields as an advantage to the engineer and regulator.

Potential research direction will be identified with specific relevance to transport safety initiatives in Australia.

This paper is an extract of a full research paper “Making the Kingfisher Archipelago a Safer Place”, Smith, D.B., 2005, available from the author upon request.

Keywords: culture; resistance; cultural resistance; transport safety

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Introduction

On January 31, 2001, the lives of more than 700 people were endangered when a Japan Air Lines (JAL) Boeing 747 narrowly missed colliding with another JAL aircraft, a DC-10-40. The aircraft passed within metres of each other, and over 100 passengers were injured when the pilot of the 747 entered an emergency nosedive. This near-miss caused world aviation safety authorities to review Traffic Alert and Collision Avoidance System (TCAS) guidelines, with particular emphasis on company operating procedures and the International Civil Aviation Organisation’s (ICAO) assertion that “*to ensure safety ... international standardisation is essential*” (Bennett 2004).

Unfortunately, there was too much resistance to standardise TCAS guidelines, and on July 1, 2002, all seventy-one people on board a Russian Tupolev TU154M and a Boeing B757-200 lost their lives when both aircraft crashed in flight at 34,890 feet above Uberlingen, Germany.

The effects of cultural resistance exhibited in this matter have common factors with other transport safety initiatives in Australia, and around the world. At the cost of many lives, cultural resistance regularly and consistently reduces the effective introduction of transport safety initiatives.

Significant research has been done in Europe in recent years on intelligent speed adaptation projects. (PROSPER 2005 and Carsten and Tate 2005). Carsten and Tate estimate that complex speed control systems are capable of saving up to 59% of fatal motor vehicle accidents, and could be implemented by 2019.

Using a real example, Australia's average annual road toll over the past 10 years is 1776 (ATSB). 59% of 1776 equates to 1047 people who could potentially be saved each year by this one aspect of road safety initiative alone if cultural resistance did not stand in the way. If a change process can be completed with the least amount of resistance, lives can be saved.

This paper will demonstrate the need for safety professionals to recognise the effects of cultural resistance, and provide insight to assist in tackling the resistance to achieve a better outcome for transport safety in Australia. It does not provide new or ground-breaking theory but does challenge the reader to consider the detrimental effects of cultural resistance in the transport sector. It also logically compiles impacting factors in a format encouraging further research.

Cultural resistance

In order to implement a change process contributing to the furtherance of transport safety, it is pertinent that the safety professional understands the effect of cultural resistance.

Cultural resistance is a complex of cultural values and interests that work together to create a resistance that is both tangible and effective in reducing transport safety initiatives. This complex system will be explained by drawing basically on previous research and anecdotal evidence.

Defining Culture:

Many people think of culture as “national culture” which incorporates the idiosyncrasies of a particular race or tribe of people, traditions and methodology that has been handed down from generation to generation.

Whilst national culture can and does have some effect in transport safety resistance, it is not the focus of this paper. The definition of culture extends far beyond national culture, and is made up of groups of people with common important values.

Anthropologists have studied culture for centuries, so there are no new concepts about culture in this study, more a focussing of cultural dynamics as they affect safety in the transport arena.

Within each culture, there are a number of specific factors referred to as “values” which are important to the operation of that culture. Even though culture is evident in our society at different levels, some of the more practical applications of cultural values in western society are democratic political processes, freedom of speech and the right to a fair trial. Interest groups, industry groups and others may have more specific cultural values, for example mountain cattlemen who place great importance on the privilege of managing leasehold in the alpine regions, and environmental groups who place importance on the protection of marine species in the Great Barrier Reef.

Webster's Dictionary defines culture as

“a complex of typical behaviour or standardised social characteristics peculiar to a specific group, occupation or profession, sex, age grade or social class” (Gove 1976).

Kroeber and Kluckhohn (1952) in Louis (1985) identified 164 different meanings of the term “culture”! For the purpose of this discussion, culture will be sufficiently defined as “values unique to a particular interest group”.

Measuring culture:

In order to measure culture, it is necessary to identify tangible components of that culture. Dr. Edkins points out the importance of tangible components when speaking about the Waterfall train crash (McInerney p.224) as he describes safety climate as more measurable than safety culture, due to its tangible components.

Whilst anthropologists have considered culture for hundreds of years, there is no proven method for quantitatively measuring culture. Cultural values have been identified in various studies, for example Fischhoff, Slovic, Lichtenstein, Read and Combs (2001). Previous studies have produced limited lists of cultural values, but no studies have produced an exhaustive list of values seen in cultures worldwide. In fact no known previous studies have viewed cultural values in the transport safety sphere at all. Fischhoff *et al* undertook the study for a different reason being proposed here, but the list compiled by them (Fischhoff *et al*, p.84) serves to illustrate the possibility of listing cultural values.

It is feasible to carry out research that identifies cultural values, and the enhancement of an exhaustive cultural values list, in which the cultural values form the tangible components for measurement.

Defining Cultural Resistance

Cultural resistance is the outworking of cultural values to create opposition to a project. In this paper that project is considered as a transport safety initiative.

It is also important to point out that resistance can be both positive and negative. Whilst it is unusual for regulators to implement laws that are detrimental to safety, resistance can keep society on track by preventing implementation of damaging or detrimental practices. This research is specifically interested in negative resistance.

Negative resistance may occur in situations where proposed regulations or policy will undoubtedly increase transport safety, yet interest groups create resistance. A live example of this is the wire rope barrier project on Victorian Highways, and the resistance by the motorcycle lobby.

The Motorcycle Rider’s Association (MRA) is the main voice of the motorcycle lobby in Victoria. The MRA has been effectively campaigning against the installation of the wire rope barriers across the State of Victoria. Numerous MRA publications show the extensive campaign waged by the motorcycle lobby. For example, see the Motorcycle Riders Association of Australia National Campaign Against Wire Rope Barriers Launched.

Following significant slowing of the program due to resistance from minority groups including MRA, VicRoads has recently reintroduced the installation program with the exception of installation on the most prevalent leisure motorcycling routes such as the Black Spur and the Great Ocean Road. VicRoads has taken a community consultation approach to this issue and has localised the project. Regardless of the

evidence for the exclusion of certain motorcycle routes, stakeholders have reached an outcome that for the time being appears to be satisfactory for all.

Measuring Cultural Resistance

Although there is no known method to quantitatively measure cultural resistance, it would be invaluable in enabling the risk manager to identify and plan for resistance that may be generated during the life of a project.

Before measuring cultural resistance, one must first measure the culture that is generating the resistance as previously discussed.

Having measured the culture, a similar method could be developed by which cultural resistance could be quantitatively measured. As well as the cultural values, other factors to consider in the measurement of cultural resistance include the historical evidence of safety initiative processes and the resistance history of particular cultures that share values, that is, common value resistance. The most likely method of developing a measurement tool for this purpose is by the use of a mathematical formula that attributes weighting factors to cultural values.

Theories and Principles Involved in the Change

There are a number of theories and principles that explain the outworking of cultural resistance, or assist to measure and deal with cultural resistance:

The Normalisation of Deviance theory

Normalisation of Deviance develops when safety margins are eroded and activities continue as normal without negative implications. People working under such conditions become accustomed to the lower standards which slowly become accepted as the norm.

A classic example of the normalisation of deviance occurred during the Space Shuttle Challenger launch program:

On January 28th, 1986, Space Shuttle Challenger exploded seconds after launch following a series of delays and launch problems. The decision to launch was not an easy one. It had been made under significant time and financial pressures.

Previous shuttle launches proceeded although o-ring faults were known to exist. Vaughan (1996) quotes Commissioner Feynman's very simple but concise definition of the theory of normalisation of deviance:

"It is a flight review, and so you decide what risks to accept... they agonise whether or not they can even go though they had some (o-ring erosion) ... and they decide yes. Then (the shuttle) flies and nothing happens. Then it is suggested, therefore, that risk is no longer so high. For the next flight we can lower our standards a little bit because we got away with it last time".

The first time that a decision was made to launch in breach of minimum safety standards, nothing bad happened. When the decision was to be made the next time, as nothing had happened on the previous occasion, the importance of complying with

safety procedures was diminished. In all subsequent decisions, at least one factor contributing to the decision was the known fact that the previous breaches had not (perceptively) detracted from safety. Although NASA states that the standards were not ignored, permits to exceed the safety standards were none-the-less repeatedly issued.

The normalisation of deviance is thus a theory whereby the importance of retaining the status-quo of safety is diminished. Substandard safety operations become accepted as the norm, and the deviation at its lowest (or most negative) point becomes more and more acceptable to the organisation, group or individual.

Normalisation of deviance is equally applicable in road safety cases, for example, resistance by truck drivers to seat belt wearing (Austroads, 1999), and resistance by the general motoring population to mobile phone restricting legislation. In the case of truck drivers not wearing seat belts, there is a cultural resistance generated from within the industry. The more often that truck drivers escape injury even though seat belts are not worn, the harder it becomes to implement the change, as the deviance from safety standards becomes the norm.

Although not drawn from within the transport sector, normalisation of deviance can also be seen at work in the example of an explosion at the Moura Number 2 coal mine in Queensland on August 7, 1994 in which 11 men were killed. (Hopkins, 1999). The normal levels by which safety was previously measured and respected were exceeded over a period of time. The excess did not immediately produce any accidents or disasters, as the workers had been trained to expect, so the respect for the levels diminished. As the levels diminished, the standard by which they were measured also decreased. Safety margins were deteriorated to the point where they were non-existent.

Social Construction of Risk

Slovic (2000) reminds us that just as danger is real, risk is socially constructed. This assertion is certainly true in many areas of transport safety initiatives. If risk is socially constructed, it can also be socially engineered. If risk can be socially engineered, it is controllable and becomes a variable, not a constant. Transport safety professionals and interest groups must consider the impact of the social construction of risk upon transport safety, as this recognition is the first step to addressing the problem.

Expected Utility Theory and Cumulative Prospect Theory

The Expected Utility Theory (original source unknown) has been accepted for many years as the basis for predicting the rational choice of individuals when faced with financial decision-making.

Although traditionally used in financial decision making analysis, it may be applied to the problem at hand, that is, transport safety. One of the stakeholders in transport safety improvement is the consumer.

One possible application of the expected utility theory involves the purchase of a new motor vehicle. The consumer is required to make a conscious decision when purchasing a motor vehicle regarding the level of safety that is purchased. Manufacturers offer a range of safety products that improve the safety of vehicle occupants, and examples include airbags, crashworthiness, and antilock braking systems. These safety products add to the initial outlay to the consumer. Clearly, the

purchaser must make a choice about spending extra money to increase the safety of vehicle occupants.

The expected utility may assist transport safety professionals to predict the safety product purchase choices of the consumer.

The cumulative prospect theory is a further development of the utility theory concept and models a four-fold pattern of risk-taking behaviour as opposed to the three-fold pattern demonstrated in the utility theory. (Tversky and Kahneman, undated).

Reversed Quandary Principle

An interesting but important principle is observed in the Reversed-Quandary Principle (Smith 2005). Although this is not a formally recognised principle, it has been identified by the author as a trend occurring across a number of research papers. The reversed quandary principle highlights the fallibility of professionals in risk perception.

Barnes (1995) points out that even scientists, policy makers and regulators have their own cultural forms of behaviour. This culture may make them very different to the public to whom they provide a service. This quandary provides a very good reason for authorities to have a good understanding of cultural resistance.

More support for this principle stems from some research conducted by Malmfors, Neil, Purchase and Slovic in the US, Canada and United Kingdom over an eight year period (Slovic, 2000). Results of the research show that scientists are as susceptible to questionable risk-benefit judgments when affected by the risk as the general public. Studies and research in which the researcher has a vested interest or a personal application may be susceptible to distortion.

In road safety situations, there is rarely (if ever) likely to be a researcher who does not have a vested interest. Therefore this theory must be applied as a warning, and should form an awareness of researchers, who need to take this principle into account when making judgements. Without due consideration (and adjustment or weighting if necessary), findings could be distorted.

Affect Principle

The Affect Principle has been thus named due to the affect of a perceived risk-benefit in the mind of an individual and the subsequent implications in risk decision-making. (Smith 2005). A number of experts recognise that the affect of a psychological process, for example Zajonc (1980), Johnson and Tversky (1983) and Alhakami and Slovic (1994) all cited in Slovic (2000) has an impact upon an individual's perception of risk. That is, the greater the perceived benefit in the mind of an individual as it affects the individual, the lower the perceived risk. The inverse rule also applies: The lower the perceived risk as it affects the individual, the greater the perceived benefit (Slovic 2000).

Asymmetry Principle

The Asymmetry Principle reminds the risk manager that winning trust is always an uphill battle and impacts on risk perception of individuals and groups (Slovic 1993 in Slovic 2000).

Risk Communication as a Discipline as it applies to Cultural Resistance

A basic understanding of the principles of Risk Communication is valuable to the risk manager in proactively preventing cultural resistance. A case study of the Civil Aviation Safety Regulation (CASR) 119 process demonstrates the value of positive risk communication.

Case Study: CASR 119 Process

A very interesting and pertinent case study relates to the proposed introduction of CASR 119 into Australian Aviation Law. CASR 119 mandates the requirement for an air operator to have a safety management system in use. The process adopted and followed by the regulator (CASA) has particular application to this research, as the approach to the drafting and introduction of proposed legislation has followed an extensive consultation process (CASA 2005).

The 1993 crash in New South Wales of a Navajo Chieftain operated by Monarch Airlines caused the death of seven persons and prompted an inquiry into the organisational failures of the airline. The subsequent crash of an Aero Commander operated by Seaview Air triggered establishment of the Staunton Commission (Bureau of Air Safety Investigation 1997). A further report released in 1995 became known as the Morris Report and addressed the safety of the general aviation sector.

During the Staunton Commission and the preparation of the Morris Report, the Bureau of Air Safety Investigation identified an urgent need to provide guidelines to air operators regarding safety systems. At this time, a problem was recognised and a resolution sought: There was no regulatory requirement for an air operator to have or maintain a safety management system (SMS).

In the year 2000, a sub-committee was formed to investigate potential for a formal safety management system. (Edkins 2005). The new sub-committee composed an all-important mixture of regulator and industry representatives. By August 2001, a draft of the now-proposed CASR 119 was published and made widely available for comment.

By 2002, Qantas and some regional airlines had renewed their own safety management systems in line with the advice in the draft of CASR 119. It is important to note that this was by way of voluntary compliance with a draft that was not yet regulated. It was, however, common belief by this stage that CASR 119 would eventually become regulated. (Edkins 2005)

In conjunction with CASA, the working party on 119 undertook an extensive public education campaign to “sell” the idea of CASR 119 to the industry. In line with the objective, the campaign goal was to gather support for the legislation, not the actual training in the use of safety management systems.

It is now approaching 10 years since this process commenced, yet the safety management system has not been introduced. The issue is still live and on schedule.

In conjunction with the rollout schedule of CASR 119, CASA has been running an education program for operators. The focus of the education program has been to educate operators about CASR 119 and the requirements for safety management systems, not to teach methods

of developing and maintaining Safety Management Systems. Workshops have been held regularly throughout the life of the project, and a SMS survey has been maintained over the same time period. The survey statistics measure the voluntary compliance by operators and acceptance of safety management systems (CASA 2005).

Risk Perception

Trust as it Applies to Transport Safety

ACETS 2003/04 survey data showed that people have least trust in media with governments not far behind (Farquarson and Critchley 2004). This may explain some basis for resistance, and forms a basis for learning. On the other hand, the greatest level of trust was shown to be for public institutions (i.e. Scientists, hospitals, CSIRO and universities). The survey data also showed that people have a great deal of trust in the products that are developed by these institutions.

The survey showed that of all technology types, Australians are most comfortable with mobile phone technology. Combining this comfort level with the finding of trust in the institutions that develop the technology, one can deduce that the public has confidence in technology that can also reduce the availability of communications. An example of the regulation of mobile phone usage is the simple request by hospitals to turn off all mobile phones whilst within certain areas of the building, or airline restrictions on using mobile phones in transit. Another example is the legislation in Victoria that prohibits the use of a handheld mobile phone whilst driving a motor vehicle. Resistance easily develops in such situations when individuals perceive that regulation is accompanied by a loss of freedom.

Slovic (2000) identifies trust as an intrinsic value in our society and lack of trust as a critical factor underlying divisive controversies.

The Impact of Perception upon Resistance

The perception of risk contributes to the trust exhibited by individuals. Accordingly, it is important for the risk professional to consider and examine the motivation for resistance, and in particular whether that motivation is spurred on by the perception of the risk, or a real hazard.

The level of resistance generated by groups and individuals is proportionate to the degree to which personal freedom will be lost or perceived to be lost. The distinction between reality and perception is important to note, as history demonstrates that even perceived loss of freedom will generate resistance.

Managing Cultural Resistance

The following characteristics have been observed throughout the studies in the main paper (Smith 2005), but it must be noted that the research is limited. A more comprehensive study of individual cases is necessary before a factual trend can be observed and/or relied upon in future calculations.

Some Common Characteristics of Unsuccessful Programs

The following table itemises common characteristics of unsuccessful programs that have been examined, and cross-references the characteristic to the relevant case, researcher or author.

Characteristic	Reference/Case for further reading
Blame Culture	McInerney/Waterfall
Normalisation of Deviance	Vaughan/NASA Windridge/Moura
Non-consultation	Windridge/Moura

TABLE 1

Some Common Characteristics of Successful Programs

Characteristic	Reference/Case for further reading
Worldwide interest	Birrell/Victorian Seatbelt Legislation
Education	Birrell/Motorcycle Helmets Johnson/Bicycle Helmets CASA, Edkins/CASR 119
Evidence for need of controls	Birrell/Victorian Seatbelt Legislation Birrell/Victorian Drink Driving Legislation
Evidence of acceptance	Birrell/Motorcycle Helmets Johnson/Bicycle Helmets CASA, Edkins/CASR 119 CASA/CASR 121A
Community pressure to act	Birrell/Victorian Seat Belt Legislation
Community Consultation	Smith, Johnson, MRA/VicRoads Wire Rope Project CASA, Edkins/CASR 119
Voluntary Compliance	CASA, Edkins/CASR 119 CASA/CASR 121A (Australia) Birrell/Motorcycle Helmet wearing Johnson/Bicycle Helmet wearing

TABLE 2

Further Research Possibilities

Further research may establish a method for quantitative measurement of culture, safety culture and cultural resistance. Further research may also enable the application of known theory to transport safety initiatives to predict individual response, as well as development of new theory to accurately measure the predisposition of society to resist implementation of transport safety initiatives.

This paper contains results of only a limited range of cases studied. There are innumerable cases that potentially add knowledge to the case at hand, and other cases are worthy of investigation in light of changing cultural resistance to transport safety.

Conclusion

This paper has demonstrated a need to measure culture and cultural resistance, with particular focus on improving transport safety. It has also highlighted some of the known theories and principles impacting upon cultural resistance, and has also named principles that may not previously have been considered in transport safety challenges.

Impacting factors have been extracted from case studies and provided to help the risk manager better manage change.

Cultural resistance has now been recognised as a detrimental contributor to transport safety, and so a change management process should be implemented. (Smith 2005)

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