Risk Communication – Warning Systems (Traffic Sign)

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ASSIGNMENT 2

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Background

World report on road traffic injury prevention shows every year an estimated 1.2 million people are killed in road crashes worldwide. For every person killed, tens of times more are injured. In many developing countries, road casualty is a severe public health problem already out of control.

(http://www.who.int/world-health-day/2004/infomaterials/world_report/en)

Road traffic accident statistics 2004, Transport Department also revealed that in Hong Kong, road crashes result in 15,000 casualties every year.

Table 1

Trend of Road Traffic Accidents (1995 - 2004)

Year	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
A) Number of accidents:										
(i) Fatal	247	252	229	204	202	162	167	162	173	160
(ii) Serious	3243	3084	3154	3103	2808	2838	3165	3118	2674	2519
(iii) Slight	11322	11061	11393	10707	11704	11949	12299	12296	11589	12347
Total	**14812**	**14397**	**14776**	**14014**	**14714**	**14949**	**15631**	**15576**	**14436**	**15026**
B) Accident rate:										
(i) per 1,000 population	2.39	2.24	2.28	2.14	2.23	2.24	2.32	2.29	2.12	2.18
(ii) per 1,000 licensed vehicles	31.7	30.8	30.3	27.9	29.5	29.2	29.9	29.7	27.6	28.4
(iii) per kilometer of road	8.6	8.3	8.1	7.5	7.8	7.9	8.2	8.1	7.5	7.7
(iv) per million vehicle-kilometers	1.4	1.34	1.3	1.28	1.33	1.28	1.36	1.35	1.29	1.35

(Source: Road Traffic Accident Statistics, 2004, Hong Kong Transport Department)

Despite much effort by Government and other parties, road casualties remain a major cause of trauma and premature death.

Because most traffic accidents are the product of several factors, the probability of accidents can be reduced in a number of different ways. There is no doubt that the following activities have prevented the increase in accidents that would normally result from increases in traffic density.

Being a woman traffic constable of Enforcement and Control Division of Hong Kong Police, in which I have been inevitably issuing tickets to each offender for three years. On the other hand, there are a large number of people asks the whys and wherefores when they were ticked.

This assignment will provide a platform for Government to exchange with both professionals and the public. The first topic introduced is “what is current road problem?” The second topic discussed is “what distinction between modern road safety and the road management systems-traffic signs?” The third issue concerned is “what factors influence driving behavior” The fourth issue is “what relationship between risk communication and risk management?” and the last issue is “what are the duty of care responsibilities of government and citizens? I also expect that it will stimulate fresh initiatives in the understanding of a warning system, traffic signs to road users.

Introduction

Current Problem-Traffic Accident

Road casualties are acute and shocking, which surpass most major epidemic diseases. Vehicle occupants, motorcyclists, cyclists and pedestrians are all susceptible. Sufferings are not limited to physical ailments, but also psychological trauma for those directly or indirectly affected.

Table 2 shows, road traffic injuries are a growing health problem, and for year 2020 it is expected that will come to the third position. This is partly due to improvements in medicine reducing deaths from other causes but largely due to the steady increase in motorisation around the world, reflecting the greater severity of motor traffic versus other causes of injury.

Table 2

Top 10 Leading Contributors to the Global Burden of Disease or Injury

1990		**2020**	
Disease or Injury		**Disease or Injury**	
1	Lower respiratory infections	1	Ischaemic heart disease
2	Diarrhoeal diseases	2	Unipolar major depression
3	Perinatal conditions	3	**Road traffic injuries**
4	Unipolar major depression	4	Cerebrovascular disease
5	Ischaemic heart disease	5	Chronic obstructive pulmonary disease
6	Cerebrovascular disease	6	Lower respiratory infections
7	Tuberculosis	7	Tuberculosis
8	Measles	8	War
9	**Road traffic injuries**	9	Diarrhoeal diseases
10	Congenital Abnormalities	10	HIV

(Christopher J.L Murray, Alan D. Lopez, 1996, The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020, Harvard University Press, P.34)

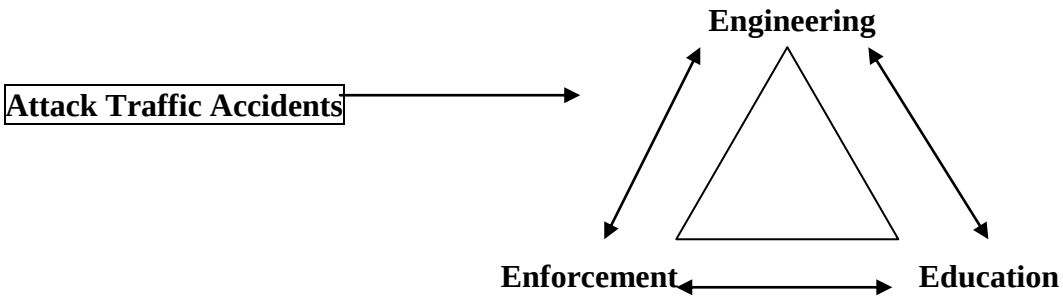
Distinction Between Modern Road Safety and The Road Management Systems

Engineering, Education and Enforcement Approach

Modern Road Safety makes a distinction between the situation and the management systems necessary to control it, with prevention activities that largely exceeds the self-evident fields of the traditional 3'E (Engineering, Education and Enforcement) approach. Modern Management systems have the aims of be inclusive, i.e. to include explicitly all activities part of such system.

(http://www.ltsa.govt.nz/strategy-2010/strategy-introduction.html)

There are three angles to attack traffic accidents:



1. Engineering of vehicles and roads –

(a) Vehicle engineering, comprising regular inspection for a "warrant of fitness" to ensure that the main components of the vehicle are safe;

(b) Improving the design of the vehicle to give ease of vision and control to the driver and so reduce the likelihood of injury in an accident; and

(c) Fitting safety equipment, such as seat belts.

2. Education and training –

(a) Children in school by road-traffic instructors and school teachers;

(b) Adolescents in the principles of safe driving and in good driving attitudes;

(c) Refresher courses for older drivers to bring home safe-driving principles and to refresh their knowledge of traffic law; and

(d) Newspaper, radio television, and other publicity, to draw the attention of all road users both to dangers and to safe practices on the road.

3. Enforcement –

(a) Adopting reasonable and enforceable traffic laws which, at the same time, are best designed to prevent accidents;

(b) Concentrating the time and energy of traffic officers on the offences, locations, and times that feature frequently in accidents; and

(c) Thoroughly testing new drivers to ensure they will not be liable to cause accidents.

Therefore, Road or traffic engineering comprises as the following:

1. Design of new roads which are inherently safe (separating opposing traffic flows, eliminating cross traffic, and providing wide shoulders and traffic lanes and good visibility);
2. Improving existing roads by realignment, improving vision, and resurfacing slippery surfaces;
3. Regulating traffic movement by installing traffic signals, traffic islands, road markings, and regulatory signs such as “stop” and “give way” signs; and
4. Assisting the driver with warning and destination signs to avoid danger and confusion.

Factors Influence Driving Behavior

Human Errors and Irresponsible Driving Behavior

Table 3 and 4 focuses on the key issues that you need to know about ensuring greater safety in transport and minimizing adverse effects of transport on health.

Table 3
Driver Contributory Factors by Severity of Accident 2004

Driver Contributory Factor	Severity of Accident			Total
	Fatal	Serious	Slight	
Exceeding speed limit	3	3	6	12
Driving too fast for road environment	7	87	246	340
Driving too fast for other road users	6	28	109	143
Failing to keep to nearside of road	0	3	17	20
Driving too close to kerb	1	50	338	389
Driving too close to vehicle in front	1	199	1716	1916
Driving too close to vehicle alongside	0	10	101	111
Overtaking on offside negligently	2	32	187	221
Overtaking on nearside negligently	1	10	102	113
Careless lane changing	7	142	994	1143
Reversing negligently	6	69	346	421
Turning right negligently	10	94	430	534
Turning left negligently	4	43	241	288
'U-turning' negligently	1	12	94	107
Stopping negligently	0	9	62	71
Starting negligently	14	105	595	714
Disobeying traffic signal	9	78	289	376
Disobeying stop sign (Halt)	0	15	75	90
Disobeying give way sign (Slow)	1	14	144	159
Disobeying double white lines	0	2	11	13
Disobeying directions of police officer	0	0	2	2
Disobeying school crossing patrol	0	0	1	1
Opening door negligently	0	13	98	111
Overtaking in zebra controlled area	0	1	3	4

Failing to stop at zebra crossing	0	5	17	22
Failing to signal movement correctly	0	1	11	12
Emerging from side road negligently	1	46	251	298
Emerging from private drive negligently	0	3	31	34
Driving on wrong side of road	2	28	97	127
Vision affected by atmospheric conditions	1	1	7	9
Distracted by action inside vehicle	1	22	86	109
Distracted by action outside vehicle	4	35	190	229
Losing control (no apparent reason)	8	85	255	348
Asleep or drowsy	5	22	66	93
Consumption of drugs	0	1	1	2
Consumption of alcohol	4	27	66	97
Sudden illness	2	5	18	25
Physical handicap (vision) or mental handicap	0	0	0	0
Physical handicap (hearing) or mental handicap	0	0	0	0
Physical handicap (others) or mental handicap	0	1	0	1
Dazzled by sun	0	0	2	2
Dazzled by headlight	0	0	0	0
Dazzled by other lights	0	0	1	1
Losing control of vehicle	19	250	1100	1369
Trying to avoid collision or otherwise: swerving	2	142	643	787
Trying to avoid collision or otherwise: skidding	2	27	102	131
Trying to avoid collision or otherwise: stopping suddenly	0	48	294	342
Using telephone while driving	1	0	4	5
Listening to walkman while cycling	0	0	1	1
Listening to radio/music while driving	0	0	0	0
Other driver factor	27	304	1606	1937

(Source: Road Traffic Accident Statistics, 2004, Hong Kong Transport Department)

Table 4

Road Traffic Casualty Contributory Factors by Degree of Injury 2004

Casualty Contributory Factor	Degree of Injury			Total
	Fatal	Serious	Slight	
Boarding vehicle	0	4	51	55
Alighting from vehicle	0	12	80	92
Injured by door on bus/PLB	0	2	15	17
Holding vehicle (stealing ride)	0	0	3	3
Falling off platform	0	0	0	0
Opening door negligently	0	1	17	18
Closing door negligently	0	1	15	16
Falling inside bus/PLB (sudden stopping/starting)	1	53	501	555
Falling on stairway of bus	1	24	121	146
Other passenger driver factor	13	222	1561	1796
Drunk	0	11	28	39
Under the influence of drugs	0	1	1	2
With defective vision	0	2	3	5
With defective hearing	0	0	0	0
Movement impaired	0	5	41	46
With mental defect	0	0	2	2
Suffering from illness	3	1	14	18
Crossing road masked by parked vehicle	0	8	33	41
Crossing road heedless of traffic (at crossing)	14	188	469	671
Crossing road heedless of traffic (elsewhere)	16	285	830	1131
In road, not crossing (jay walking)	0	13	68	81
Listening to walkman	0	0	0	0
Inattentive	12	165	749	926
Other pedestrian factor	6	52	245	303

(Source: Road Traffic Accident Statistics, 2004, Hong Kong Transport Department)

The above factors revealed that human errors and irresponsible driving behavior are to a large extent the ultimate causes of road casualties, but there are actually deeper underlying social, psychological and technical factors which are yet to be

overcome. For these reasons, it is necessary to explore and promote new methods in road safety from different perspectives.

Most of these happenings are believed to be related to vehicles out of control, and were attributed to many possible causes including excessive speeds, inappropriate steering in lane changing, drink driving and preceding collisions with other vehicles. In any case, there are still many questions pertaining to pedestrian roadside safety.

Relationship Between Risk Communication and Risk Management

Successful Risk Communication

"Successful risk communication is not about giving out information or about making stakeholders understand. Today, successful risk communication can result only when the quality of debate among government, the public and all stakeholders is ought to know." said Rachel Thamm, Lecturer of University of New England.

"Risk Communication identifies the need for a two-way, rather than a one way, flow of information. Effective civil care and security management depends on the public's understanding of the risks and the risk management options. (If the public's understand or don't agree, then they just will not act!) It is about enabling the best service provision based on the needs of the client – finding out those needs through useful and mature two-way dialog." (John Salter, 2006, Unit Note-PDPS 276 Planning for Civil Care & Security, UNE, P. 36)

Definition of Risk Communication

On Internet defined that "Risk communication is an interactive process of exchange of information and opinion among individuals and groups, and institutions. It involves multiple messages about the nature of risk and other messages (not strictly about risk) that express concerns, opinions, or reactions to risk messages or to legal and institutional arrangements for the management of risk." (http://frost.ca.uky.edu/agripedia)

An effective road safety management will be considered the hazards effect on the community and the interaction of both with the stakeholders so all member have a duty to care for their personal welfare and the welfare of their fellow colleagues. We ought to take our reasonable care to prevent personal injury or injury to others.

"Duty of Care is a key focal point for civil care and security managers and Risk Communication is a fundamental part of duty of care." (John Salter, 2006, Assessment-PDPS 276 Planning for Civil Care & Security, UNE, P.5)

"Risk communication, which further examined that Communication is of fundamental importance in the regulation of risks, allows people to participate, represented in decisions about managing risks." said Rachel Thamm, Lecturer of University of New England.

The Duties of Care Responsibilities of Government and Citizens

“Development and maintenance of a reliable communication capability to alert public officials and emergency response personnel, warn the public, and effectively manage response to an actual or impending emergency.” Said Lecturer of University of New England.

Government’s Responsibilities

Hong Kong is following other developed countries in launching road safety management systems as they have obtained considerable achievements.

At the government level, the Department of labor has responsibility for enforcing the standards and regulations of traffic. The standards also can be enforced at the state level using local laws.

Transport Department will analysis the accident for promoting and educating how to prepare, prevent, reduce and recover these risks.

Risk Communication Benefit

In general, risk management include transferring the risk to another party, avoiding the risk, reducing the negative effect of the risk, and accepting some or all of the consequences of a particular risk. “Traditional risk management, which is discussed here, focuses on risks stemming from physical or legal causes.” (http://en.wikipedia.org/wiki/Special:Search?search=risk+assessmentmanagement).

Being a government also would like to exclude his liabilities. The first defense

against potential liability problems is to anticipate risks and eliminate or reduce them, a process known as risk management. Once government will to inspect road regularly for all types of potential hazards, such as trails in need of maintenance, unsafe buildings, dangerous areas, etc.

"Through risk communication, which helping you communicate with the right audiences, both those internal to your organization and external stakeholders who are affected by what your organization does, would increase your organization's effectiveness." said Dr. Ortwin Renn, Chair for technical and environmental sociology at the University of Stuttgart. (europa.eu.int/comm/food/risk/session1_1_en.pdf)

So, all citizens ought to understand the importance of traffic signs, which essential to know where these traffic signs fit in the hierarchy of safety efforts.

Safety Hierarchy

There is a safety hierarchy is considered to be a body of priorities or actions listed in descending order of priority.

Table 5, Barnett and Brinkman (Bresnahan et al., 1993) produced a table depicting what is called the "current consensus" which was determined from the available literature.

Table 5

Adaptable Safety Priority Hierarchy

Priority	Action	Hydropower Project Examples
First	Eliminate the hazard and/or risk	Raising high voltage electric lines to heights above where sailboat masts and anglers' fishing lines and tackle may come close enough to create an electric current to ground through sail boaters or anglers. Designing deep water intake structures versus surface intakes. Moving/designing beach or marina areas to a safe distance from the dam crest or intakes. Modifying ramping rates to increase reaction time of downstream users.
Second	Apply safeguarding technology	Installing fences, gates, escape ladders, safety rings, boat barriers, warning sirens, strobe lights and other physical protective measures.
Third	Use warning signs	Providing conspicuous signage denoting non-obvious safety hazards.
Fourth	Train and instruct	Conduct public outreach meetings with user groups or other safety officials.
Fifth	Prescribe personal protection	Require personal flotation devices, hard hats, boots or operator certifications.

(Thomas F. Bresnahan, Donald C. Lhotka, Harry Winchell, 1993, The Sign Maze: Approaches to the Development of Signs, Labels, Markings and Instruction Manuals, P.3)

From the above, the importance of “warnings” as the third action in the hierarchy as readily understandable. Road Traffic Ordinance (Cap. 374) and Traffic signs (Road Users Manual) are used to promote safety and guiding road user behavior. The objective is to eliminate or reduce the frequency and severity of bodily injures and to mitigate property loss. Traffic ordinance, road users manual and traffic signs

are perhaps best described as communication devices that advise or point out road hazard to an individual. (Hong Kong Government, 2003, Road Traffic Ordinance-Cap. 374)

Road Traffic Ordinance (Cap 374)

Government set of rules, enforceable by the courts regulating the relationship between the state and its subjects, and conduct of subjects towards one another. (HarperCollins Publishers, 1993, Law - Collins English Dictionary & Thesaurus)

Traffic signs are devices placed along, beside, or above a highway, roadway, pathway, or other route to guide, warn, and regulate the flow of traffic, including motor vehicles, bicycles, pedestrians, equestrians, and other travelers, said LEUNG Shu-kei, Traffic Accident Course Instructer, Police Driving School.

The principal objective of traffic signs was to facilitate vehicular and pedestrian movement in a safe and efficient manner. The speed limit sign, which ultimately became standardized as rectangular with a black message on a white background, was devised as a control measure based on several criteria.

"The word warning may refer to a signal of danger. A warning system is any system of biological or technical nature deployed by an individual or group to inform of imminent danger. Its purpose is to enable the deployer of the warning system to prepare for the danger and act accordingly to mitigate against or avoid it. (http://en.wikipedia.org/wiki/Warning_System)"

Traffic Signs is a visual warning system, which is to call attention to a hazard and to change or reinforce the way it will be perceived by the viewer in order to avoid accidents or injuries. (Road User Manual, 2001, Transport Department)

There are two basic reasons or issues that bear upon the development and use of traffic signs. These are external and internal by nature. External issues are those related to the effectiveness or adequacy of the message (user understanding), the need to protect the user, and requirements for providing warnings. An example of such requirements is regulations established by Hong Kong Government to protect the safety and health of workers or consumers. Internal issues are those to designing a uniform approach for near universal application – also known as standardization – and how to reach a specific audience. An example would be drivers in a road such as double white lines or traffic lights.

Numbers of Factors Influence Signs

There is a number of factors influence a sign's effectiveness. The text height, sign size, typography (font style), color, symbols used, shape, phrasing, and the message conveyed all have an impact on how a sign will be perceived.

(Thomas F. Bresnahan, Donald C. Lhotka, Harry Winchell, 1993, The Sign Maze: Approaches to the Development of Signs, Labels, Markings and Instruction Manuals Conclusion & Recommendation, P.29-31)

American National Standard Institute-Safety Color Code Z535.1 New York, 1991

(ANSI Z535) has developed color codes establishing general meanings for eight colors that are used to convey traffic control information. The meanings that are associated with these colors by the general public make them appropriate for use at hydropower projects. The following general meanings can be used when designing signage:

Color	**Meaning**
Yellow	General warning
Red	Stop or prohibition
Blue	Road user services guidance, tourist information, and civil defense route
Green	Indicated movements permitted, direction guidance
Brown	Recreational and cultural interest guidance
Orange	Temporary traffic control
Black	Regulation
White	Regulation

(Thomas F. Bresnahan, Donald C. Lhotka, Harry Winchell, 1993, The Sign Maze: Approaches to the Development of Signs, Labels, Markings and Instruction Manuals Conclusion & Recommendation, P.29-31)

Everyone has his duty to care their own safety and that of other people including government and the public. The extent of responsibility depends upon the amount of control we have over activities at the road. Being a road user ought to ensure our behaviors are aware of their responsibilities by ensuring that safety duties are included in every action.

Traffic accident always affects you and me. Communication is of fundamental importance in the regulation of risks. Transport Department and Road Safety Office of Police Force also analysis the accident for promoting and educating how to prepare,

prevent, reduce and recover these risks. (http://www.td.gov.hk, http://www.info.gov.hk)

Set up traffic signs is fundamental to reach good road security management. Government is required to provide information to citizens, to alert them to areas where hazards may exist and to improve their understanding of road safety practices. For example, warning signs, posters, booklets, web site and speech could be provided under this duty. (http://www.info.gov.hk/police/hkp-home/english/misc/traindex.htm)

"Communication is the process of exchanging risk information, usually via a common protocol. It is included speech, interpersonal and organizational communication." (http://en.wikipedia.org/wiki/Communication)

To Conclude, Communication is the main point of management, if government speaks and shows clear to exchange with citizens what you need. It would increase government's effectiveness.

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Other Information:

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