

THE DEVELOPMENT OF TRAFFIC ACCIDENT RISK MANAGEMENT METHOD

PENGEMBANGAN METODE PENGELOLAAN RISIKO KECELAKAAN LALU LINTAS

Don Gaspar N. da Costa, Siti Malkhamah, Latif Budi Suparma

Universitas Gadjah Mada

Jl. Grafika No.2 Yogyakarta

*[Corresponding author: dnoesaku@gmail.com](mailto:dnoesaku@gmail.com)*¹⁾

Diterima: 3 Oktober 2016, Revisi 1: 21 Oktober 2016, Revisi 2: 1 November 2016, Disetujui: 9 November 2016

ABSTRACT

The lack of resource capacity is proved to be a barrier to the accident risk management measures. However, previous studies show that most of causes (risk factor) and risk trigger were still analyzed separately while an integrated risk management scheme is very limited. The aim of this study is to develop integrated traffic accident risk management method (scheme). It is developed based on the result of investigation toward the substance of current accident risk management pattern. It was found that 1) the variables coverage in risk analysis process should accomodate not only risk factor but also risk triggers and their descriptive variables 2) to minimise the uncertainty in risk analysis method, the election of the periodical time, duration and location of the survey should be in accordance with the contextual needs 3) it is required to develop appropriate scheme of accident risk management by integrating all related variables suite to local conditions comprehensively and proportionally. In addition, stopping sight distance model is recommended to being used in accident risk analysis.

Keywords: accident risk management pattern, integrated approach, risk management scheme, uncertainty risk

ABSTRAK

Kurangnya kapasitas sumber daya terbukti menjadi kendala pengelolaan risiko kecelakaan. Walaupun demikian penelitian-penelitian terdahulu menunjukkan bahwa sebagian besar faktor penyebab dan pemicu kecelakaan masih dianalisis secara terpisah, sementara skema pengelolaan risiko terpadu sangat terbatas. Tujuan studi ini adalah untuk mengembangkan skema pengelolaan risiko kecelakaan lalu lintas terpadu. Pengembangannya didasarkan pada hasil investigasi terhadap substansi pengelolaan berbagai pola pengelolaan risiko kecelakaan yang ada. Ditemukan bahwa 1) variabel yang dipakai dalam proses analisis risiko harus tidak saja mengakomodir faktor penyebab dan pemicu kecelakaan melainkan juga variabel-variabel penjelasnya. 2) untuk meminimalkan aspek ketidakpastian dalam metode analisis risiko, penentuan periode, durasi maupun lokasi survai harus disesuaikan dengan kebutuhan kontekstual di lapangan 3) diperlukan upaya pengembangan skema pengelolaan risiko kecelakaan yang lebih sesuai dengan mengintegrasikan pengaruh tiap variabel terkait secara menyeluruh dan proporsional. Selain itu, model Jarak Pandang Henti direkomendasikan untuk digunakan dalam analisis risiko kecelakaan.

Kata kunci: pola pengelolaan risiko kecelakaan, pendekatan terpadu, skema pengelolaan risiko, ketidakpastian risiko

INTRODUCTION

According to the data, there were 1.2 million fatalities and up to 50 million non fatal casualties each year (WHO, 2008). It was equal to one victim in every six seconds remaining. In Indonesia, 61% of traffic deaths are of 2 and 3 wheeler rider or passenger (WHO, 2011). Even in small towns such as Kota Kupang (East Indonesia), the involvement of motorcyclists in fatal accident is almost 100% (daCosta, 2012). Fatal accident leads to profound human sorrow and causes of loss in developmental resources, particularly in low to middle-income countries (Bliss & Breen, 2009). The tendency is also occurred in maritime sector (Siswoyo, 2016). Therefore, transportation safety is a continuing challenge for transport engineer because of public expectation that safety will continue to be improved (Banks, 2004). Accordingly, the United Nations declared the Decade of Action (DoA) of Road Safety 2011-2035. The similar program was launched by the Indonesian Government, i.e. the National Road Safety Master Plan (RUNK) 2011-2035 for the same reason.

Both of them are launched in order to increase the capability of institutional management arrangement, but the result of a preliminary investigation shown that the pattern of the current traffic accident risk management were not integrated (Vlahogianni, et al., 2012) where most of accident risk management activities were done partially. Accident's causes and triggers variables were identified and analyzed separately such that the recommendation could not be directly applied. In addition, an integrated risk management scheme is very limited.

This reality lead us to a big question i.e. that when it is evident that an integrated management activities will surely provide a more optimal result, then why the pattern of partial management is still occurred? In addition, the World Bank's Global Road Safety Facility Strategic Plan (2013) also points out that "safety management capacity weaknesses are

hinder improvements in road safety", reconfirmed the same statement that is declared on 2009. It indicates that the institutional arrangement problem is the root causes of these global issues. At this point, it should be aware that the keys to success in achieving the target of DoA 2011-2020 and RUNK 2011-2035 are based on how to strengthening the capability of evaluation and/or development the traffic accident risk management methods.

Based on the situation, the objectives of this study is to investigate not only to the substance of the material aspects of the management of each road safety activity, but also to the develop an accident risk management pattern.

METHOD

The substance of various accident risk programs were identified and collected as well as investigated based on the result of study literature. The substance of data includes the type of activities, procedure implementation and objects of study. In addition, according to WHO (2011), the scope of investigation is also focused on the type of implementation's mechanism of each event, their basic philosophy and the purpose designation of each activity as well as their progress and/or implementation constraints.

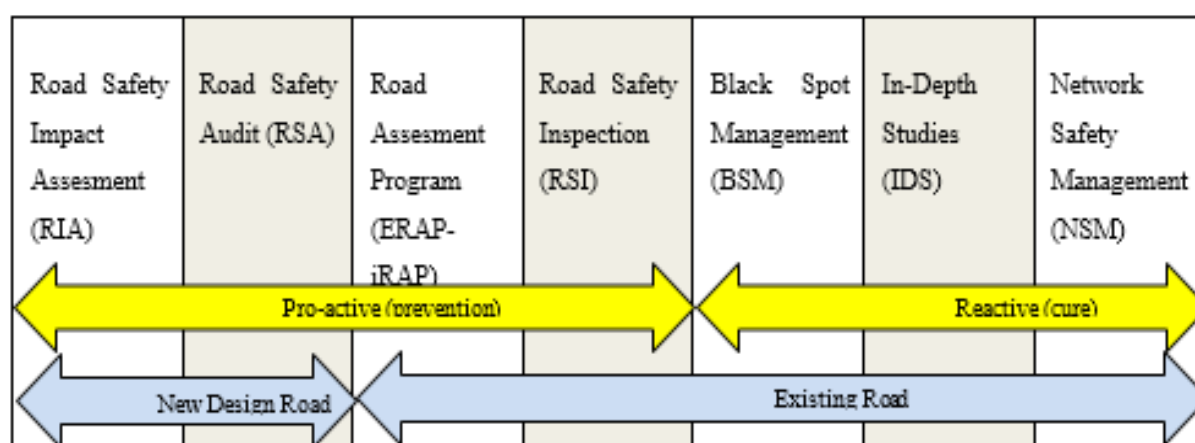
In order to improve and obtain the more appropriate road safety implementation strategy and techniques for Indonesia's conditions, their advantages and disadvantages are compared to Indonesian current road management pattern and/or guidance. The difference among them was classified and stated as important findings such that according to it the improved Road Safety Management Programs (RSMP) for Indonesia could be properly developed.

RESULT AND DISCUSSION

A. Traffic Accident Risk Management Pattern and Its Implementation's Issues

The main objectives of risk management is usually related with how to prevent and/or reduce the number of accident and its severity, as can be seen in Figure 1. It shows that all of those accident risk reduction agendas were complementary activities, not an alternative option, confirmed to (Cardoso, et al., (2005). Accordingly, all of the variables which influencing an accident risk not only should be covered in the substance of material of each

program but also should be inter-correlated and integrated. Unfortunately, current safety management programs tend to be conducted separately since there was no detail explanation toward institutional arrangement aspect, such as who was the leader sector, or which event should be undertaken immediately or concurrently or consecutively in order to support another events.



Source: WYGEngineering, 2012

Figure 1. Road Safety Management Program (RSMP) Framework, adopted from

In this particularly case, if it is assumed that the current traffic safety problems are the representative of the existing design infrastructure process and it's operational mechanism, so that it is suggested that the main problem needed to be undertaken is the risk management pattern.

The favorite type of activity of global road safety agenda such as noted in the DoA 2011-2020 and in the Indonesia Master Plan of Road Safety (RUNK) 2011-2035 is RSA/I due to their pro-active management type, which was indicated more efficient.

Unfortunately, although the RUNK was declared in 2011, today the RSI guideline has not been issued by the Indonesian government. However, in some areas, the RSI program has been carried out, such as in Yogyakarta (Central of Java). Accordingly, from interview and investigation it was found that 1) the

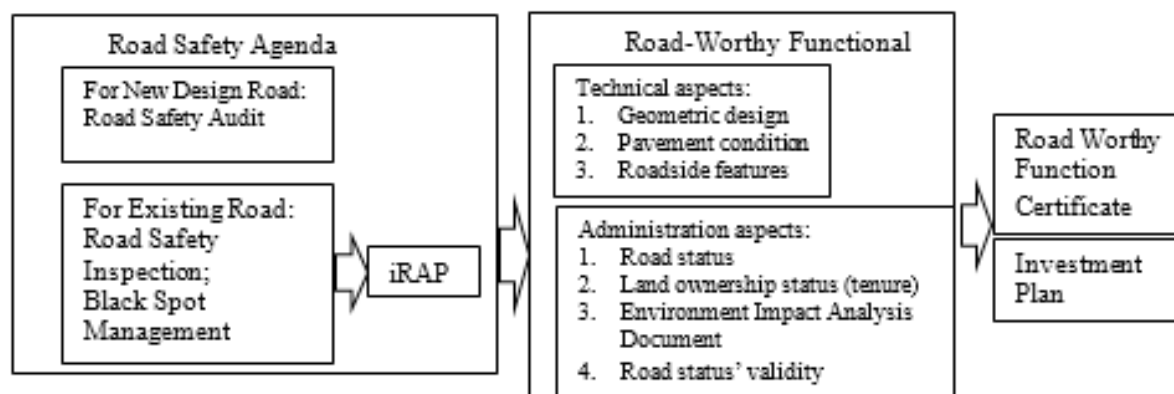
implementation of the RSI in Yogyakarta is still in the trial stage, not mandatory 2) hazard components which were evaluated based on the presence/absence of the exposure to danger i.e. hazardous condition and/or object on road due to the lack of geometric and roadside condition only. However, ignoring of the effect of vehicle and road user behavior related factors not only occurred in Indonesia, but also in some Europe countries. The substance of their directive of RSA/RSI indicates the same tendency (NastConsulting, 2011; WYGEngineering, 2012). 3) In Indonesia, a road is declared as open access to public if qualified both of technical and administrative requirements. The administrative requirement is not an alternative option but a complementary aspect (see Fig. 2).

On the other hand, the following scope of RSI's substance (Cardoso et al., 2005) indicates that government gave a big portion of accident

risk management based on the exposure of geometric and roadside facilities such as functional aspects (speed limit, land use, access point), cross section (width and number of lanes, road surface, shoulder, drainage, utility, pedestrian and bicyclist lanes), alignment (radius curve, sight distance), intersection (movement characteristic on junction with/without traffic light), public and private service (deceleration or access lanes from service or rest area, controll access on school, hospital, and other public area, parking and public transit system), vulnerable road user access & mobility (pedestrian dan bicyclist lanes), traffic signing, marking & lighting (presence and

functionality), roadside features (bridge, kerb, advertisement).

Regardless of the institutional aspects of implementation, the substance of accident risk management patterns which is adopted by the RSA/RSI is based on a risk-based approach (Cardoso et al., 2005; NastConsulting, 2011). The probability of an accident is determined based on the justification of experts due to the presence/absence of hazardous condition and/or object, while the consequence is determined based on the level of injury. Consequently, the substance of the probability of accidents is depending on the types of used inspection method and the result become subjective.



Source: adopted from Suhardi, 2012

Figure 2. Functionally Relationship Among Road Safety Management Events in Indonesia

B. Implementation's Constraint

Table 1 shows that all current accident risk management more focus on the effect of road and road environmental to the presence of accident risk probability rather than human and vehicle factors. It strongly indicates the presence of latent issues due to the lack of institutional arrangement capability in current accident risk management activities.

It can be seen that there is no standardized scope of activity in RSI. Only the Serbia RSI guidance which declared explicitly that the effect of human factor such as speed choice, perception and workload is required

to be considered (WYG.International, 2012). When this condition is confronted with socio-economic and institutional arrangement problems in Indonesia, it could be understand that the most appropriate program which could be applied immediately is RSA and RSI because human related factor due to budgeting, human resources and institutional arrangement capability are the domain latent issues in Indonesia (Suhardi, 2012).

Accordingly, based on the experience of implementation the road safety management projects in some countries and Indonesia, it was found some strategic issues rely on three main implementation's stages as follows:

Table 1. Matrix of Accident Risk Management Programs' Substance

Tittle of Program	Type of Activity		Scope of Activity				
	Prevention	Reaction	Road related factor	Vehicle related factor	Human related factor	Road environment related factor	Institutional & administrative aspect
RIA	+	-	+	-	-	-	-
RSA	+	-	+	-	-	+	-
ERAP-iRAP	+	-	+	-	-	-	-
RSI	+	-	+	-	+/-	+	-
BSM	-	+	+	-	-	+	-
IDS	-	+	+	+	+	+	-
NSM	-	+	+	-	-	-	-
RWFT	+	+	+	-	-	+	+

Source: result of analysis, 2016

1. At the planning stage

Since all of the accident program are complementary task (Cardoso et al., 2005), integrating all related risk factor, risk trigger and their descriptive variables in one object design is a crucial basic needs. The result is could be bias and/or become latent issues. In this particularly case since speeding is commonly knew as the primary factor which caused accidents, it is felt that stopping sight distance (SSD) model is one of strategic tools that should be considered seriously because it reflects not only risk factor (speed choice, reaction ability, road condition, braking system) but also risk trigger (types of braking or braking capability; steering control; perception toward advantages or dis-advantages of speeding; level of familiarity against traffic, road, vehicle and road environment conditions) and their descriptive variables (age, gender, riding experience, duration of riding) simultaneously. Unfortunately, the use of SSD in traffic accident risk analysis and/or evaluation is very limited. It is suggested that in the future, the SSD model is need to be developed such that it's usage is not only at the planning stage, i.e. for infrastructure design purposes,

but also for accident risk analysis and/or evaluation devices. The argumentation is simple, i.e. designing and evaluating or monitoring devices should be based on the same analytical model such that its efficiency and effectiveness could be measured consistently.

In addition, according to the simplicity in SSD methods and since the human and financial resources that is needed to apply the RSA/RSI is relatively less than other type of RSMP, the improved SSD model could be used to support the implementation of the RSA/RSI more easily, in short term of implementation's time scale. Therefore in this particularly case, the new RSA/RSI guidance should be established first.

Further, the current accident risk analysis models such as involvement model (Poisson, negative binomial model), severity model (occupant specific model) and occupant model (integration of involvement and severity model) usually use historical time series data (Nassar, 1996) which is not only very rare and also inaccurate (Munawar, 1999) since not every crash had been recorded. Consequently, these models could not be used easily.

2. At the implementation stage

In a particularly case, since the presence/absence of a hazard conditions and/or objects on road is determined based on expert's detection ability and their technically justification among them (NastConsulting, 2011; WYGEngineering, 2012), the subjective method could triggers the uncertainty in risk assessment's result, referred to McCuen, et al. (2011).

Therefore, in order to minimize the uncertainty, the election of time period, duration and location of the survey should be suited to the contextual needs and/or local traffic (vehicle volume & density, operational speed, vehicle composition, vehicle movement pattern, distance & time headway), road user (speed choice, riding skill, riding experience, braking ability, perception, motivation, attitude), road (geometry design, surface & grade condition, types of intersections), vehicle types (dimension, weight, deceleration and braking system, acceleration system, driver/occupant's protection) and road environment (on-street parking, entering-exiting vehicle from/to access points, crossing pedestrian, sight obstacles) characteristics, include the effect of mixed land used (types, number, scale and location distribution of socio-economic activities) to trip purposes and other traffic characteristics as previously mentioned.

3. At the evaluation stage

In order to determine or analysis and/or evaluate the presence of hazardous condition it is required to establish the appropriate risk indicator for each observed or evaluated subject. In this particularly case, previous researchers used time to accident (Lamble, et al., 1999;

Malkhamah, et al., 2005), deceleration rate (Malkhamah et al., 2005) and safety factor, i.e. the ratio of sight distance to stopping distance (Smith, et al., 2013) as risk indicator. However, even though these indicators could not explain the variables behind all of risky conditions which is occurred, but at least it could be used to analysis accident risk probability and its potential consequences.

Based on the aforementioned findings it could be inferred that risk factor, risk triggers and their descriptive variables should be considered proportionally and simultaneously in each accident risk management stages. Unfortunately, today, all current road safety programs did not accommodate these issues properly. Consequently, it is required to develop a more appropriate risk management pattern, suite to each local condition.

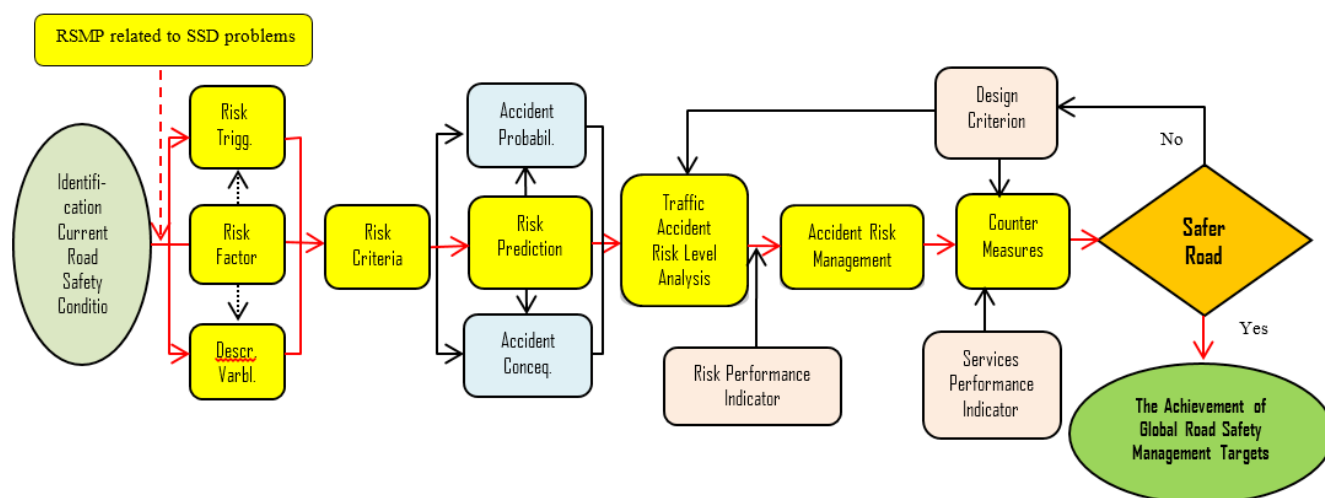
C. Recommended Accident Risk Management Scheme

Based on the aforementioned findings, i.e. that accident risk is a function of risk factor, risk trigger and their descriptive variables, in order to develop the safer road it is need to integrate all related variables into each accident risk management scheme, as can be seen in Fig.3.

However, since risk indicators are various due to its substance, it is necessary to apply this conceptual framework into local road safety policy consistently. In addition, in order to accommodate all of those variables it is felt that stopping sight distance (SSD) model is the most appropriate model which could be used to represent the effect of risk factor (speeding behavior, braking system, acceleration ability, road condition), risk trigger (rider's perception, motivation, attitude; braking capability, steering control, level of familiarity against

traffic, vehicle and road conditions) and their descriptive variables (age, gender, riding

frequency, duration of riding) concurrently and proportionally.



Source: result of analysis, 2016

Figure 3. Development of Traffic Accident Risk Management Scheme

The argumentation is simple, i.e. in order to avoid crash every rider need an adequate time and distance to react and brake safely. Consequently, all accident risk indicator or reduction activity should be based on or related to SSD model. Unfortunately, the use of SSD as risk indicator is very rare. So far, only Smith, et al. (2013) who explicitly recommended the use of sight distance to stopping distance ratio as accident risk indicator.

In addition, the term of its obtained stopping distance was based on open road experiment without further explanation toward minimum reaction time, the use of braking system and/or types of braking as well as the effect of engine brake deceleration rate. Consequently, the term of minimum SSD should be improved because current minimum SSD is referred to AASTHO's recommendation i.e. based on minimum reaction time and maximum deceleration rate of 1 s and 3.4 m/s² respectively (AASTHO, 2004; Layton & Dixon, 2012).

Therefore, the mechanism of integration the effect of these issues into Indonesian road

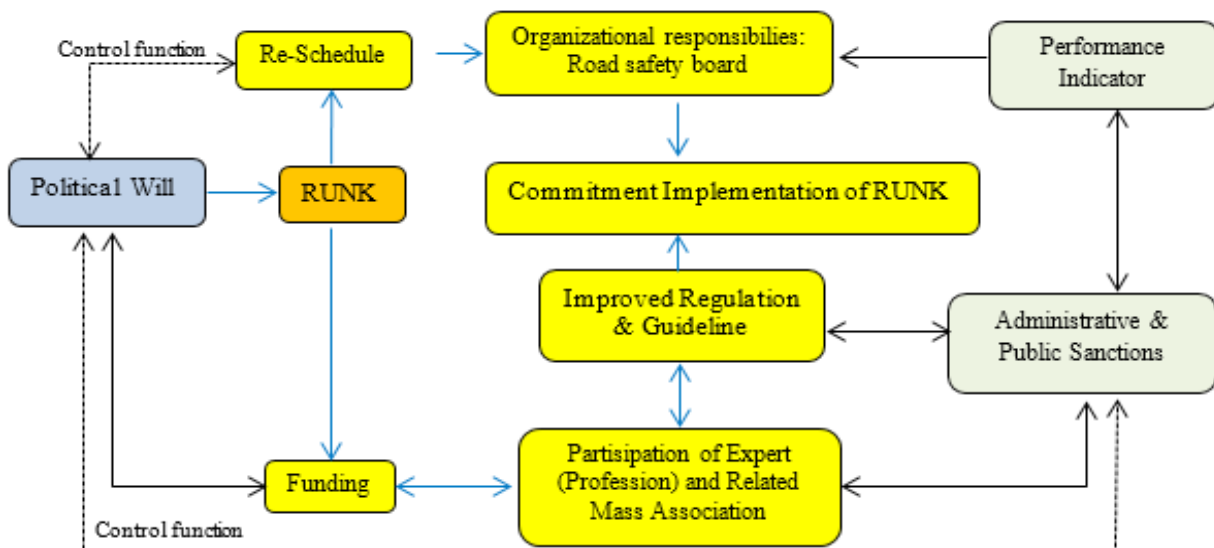
safety policy is as described in Figure 4, confirmed to road safety management standard procedure, i.e. by including the effect of institutional arrangement, intervention and result proportionally (WYG Engineering, 2012).

It shows that each policy is followed by another policy iteratively in order to strengthen previous policy. Therefore, it is needed a continuing support of the legal aspects such as regulations, enforcement of the rules, the imposition of sanctions for the offense. Further, it is needed a continuous educational approach by including active participation of experts and educational institutions through continuing institutional supports from both government and legislature.

It is also needed the political awareness since most of current political products is tend to be more focused on administrative sanctions, instead of public sanction. Even though the model of public sanction did not have to be standardized in a regulation, but public is entitled to assess the performance of government in other format of

society control mechanism by using press, social media and other potential social control forms. Changes in service society performance then

eventually return to not only the conscience of the government but also the society control power.



Source: result of analysis, 2016

Figure 4. Proposed Strengthening Scheme of Accident Risk Management in Indonesia

Furthermore, since the success or failure of accident risk management is depending on the performance of each support system, it is required to establish the performance indicators of each support system. Accident risk management's performance indicator could be measured based on:

1. Substance of Risk

Since risk is a function of probability and consequence, the probability variables should cover of not only risk factor, but also risk trigger and their derivative descriptive variabls (Joshi et al., 2010; Wong, et al., 2010)

2. The Availability of Guideline or Directive.

A good guidance should provide adequate design criteria and/or design standard of road infrastructure as a mandatory needs. The absence and/or lack of these criterias are hinder improvements efforts to road safety.

3. Organizational Responsibilities

Although the availability of safety unit in all public sector related are relatively adequate, but road safety projects were very rare. Even in a small town with a high level of fatality index such as Kota Kupang, there is no budget allocation for road safety projects in this recent decades due to dichotomy priority among road and transport needs. Development and maintenance road network is argued more important and urgent rather than road safety improvement projects.

Principally, the clue lies with the setting of the substance of term of reference (ToR) of road infrastructure design projects and their construction works' specification. Unfortunately, budget constraints were always being used as an excuse to neglect safety aspects in whole transport projects.

Whereas, the increase of total project costs or additional costs due to the integration of safety cost is relatively small.

4. Legal Concerns

Since there was an indication of violation on road traffic regulation caused by lack of law reinforcement, it led us to a basic needs, i.e. a revolution of the way thinking, such as:

- a. The violation of rules and risky behavior should be seen as one indication of a crime as it could lead to the loss of someone's life. Consequently, every violation must be punished firmly. In addition, the mechanism for the imposition of sanctions should be clear and transparent.
- b. The support system needed for running this mechanism is the increasing of public awareness by educational improvement of road safety. Therefore, introducing and/or integrating road safety aspect in educational curriculum from the elementary school level was a strategic step. This will change the way of people thinking and behave toward road safety.

5. Society Control Mechanism

The availability of public access allows was resulted a control system of insitutional performance of accident risk management in a transparent and accountable way. But since this idea is a new paradigm, it is required to increase the role of press in order to trigger the society participation. Therefore, the press is play major role in supporting the effort of the socialization of

road safety campaign programs.

D. Mass Action Plan

According to the aforementioned findings and discussions above, it is recommended a number of strategic steps, as follows:

1. It is required to map the structural problem in road safety issues through all road safety units in every related public institution such as Directorate General of Bina Marga (Highway), Transportation Ministry and the Regional Planning and Development Board. Then, all of those problems are integrated into master plan of road safety. Therefore, there should be a uniformity usage of road safety criterias and performance indicators in each related design products of each of them.
2. It is needed to produce the RSI guideline immediately and arrange a sustainable road safety funding system based on the road safety master plan.
3. Since the time limit to achieving the RUNK's programs is exceeded, it is needed to accelerate the implementation of strategic and urgent programs in accordance with the ability of the provision and managing the financial arrangement for the road safety projects.
4. Re-building the scenario of sustainable funding such as when to start, what are the necessary resources, how to provide those resources, what is the supporting needs, etc.
5. Increasing the participation of high education institutions and society or non profit organization such as the Indonesia Transportation Society and the National Committee of Transportation Safety.

CONCLUSION

According to the objective and the result of discussion it could be inferred that it is required to develop an integrated accident risk program which reflects the effect of risk factor, risk trigger and their descriptive variable simultaneously, suite to local condition. The developed accident risk management scheme should be implemented easily with less resource. In addition, stopping sight distance model is one of the most appropriate model that could be used to analysis and/or evaluation accident risk for its potential ability in represent not only the effect of human behavior but also traffic, vehicle, road and road environment condition to various accident risk level comprehensively and concurrently.

RECOMENDATION

Since RSA/RSI was the most appropriate accident risk programs that could be applied widely in Indonesia, in order to minimize their uncertainty in that model, it is required to improve the minimum stopping sight distance model and integrate it into RSA/RSI guidance such that all potentially related variables could be identified and analyzed comprehensively.

ACKNOWLEDGEMENT

This study is undertaken by financial support of Yayasan Pendidikan Katolik Arnoldus, Universitas Katolik Widya Mandira Kupang, province of East Nusa Tenggara, Indonesia.

REFERENCES

- Banks J.H. 2004. *Introduction to Transportation Engineering-International Edition*. 2nd Edition. McGraw Hill Serries in Transportation. New York.
- Bliss T and Breen J. 2009. *Country guideline for the conduct of road safety management capacity reviews and the specification of lead agency reforms, investment strategies and safe system projects. Implementating the recommendation of the World Report on road traffic injury prevebtion*. The World Bank GlobalRoad Safety Facility.
- Cardoso, J. L., Cristian, S., Elvik, R., & Sorensen, M. 2005. *Road Safety Inspections : best practice and implementation plan*. European Union.
- Da Costa, D. G. N. 2012. *Accident Risk Analysis of Motorcyclist. In 15th International Symposium of the Indonesian Inter University Transport Studies Forum (pp. 1–11)*. Bekasi, Jakarta: FSTPT.
- Jörg H. Kubitzki. 2012. *Traffic Casualty Risks Are On The Rise*. Allianz Risk Pulse-Focus: Mobility and Road Safety. https://www.allianz.com/v_1349180621000/media/press/document/riskpulse-okt-12_de.pdf
- Joshi, S., Bellet, T., Banet, A., Robger, L., Turetscheck, C., Risser, R., ... Humphrey, K. 2010. *Understanding risk taking behaviour within the context of PTW riders*. Paris. Retrieved from www.2besafe.eu
- Lamble, D., Laakso, M., & Summala, H. 1999. *Detection thresholds in car following situations and peripheral vision: implications for positioning of visually demanding in-car displays*. *Ergonomics*, 42(6), 807–815. <http://doi.org/10.1080/001401399185306>
- Layton, R., & Dixon, K. 2012. *Stopping Sight Distance* (No. Kiewit-2012/02). Oregon.
- Malkhamah, S., Tight, M., & Montgomery, F. 2005. *The Development of An Automatic Method of Safety Monitoring at Pelican Crossing. Accident Analysis and Prevention*, 37(5), 938–946. <http://doi.org/10.1016/j.aap.2005.04.012>
- McCuen RH, Ezzell EZ, Wong MK. 2011. *Fundamentals of Civil Engineering _An Introduction to the ASCE Body of Knowledge*. Taylor and Francis Group-CRC Press. Boca Raton – USANassar, S. A. 1996. *Integrated Road Accident Risk Model (ARM)*. University of Waterloo.
- NastConsulting. 2011. *Project is initiated by ERA-NET ROAD D 3 . 1 Road Safety Inspection Schemes Review Version May 2011*. Viena.
- Siswoyo, B. 2016. *Public perception of safety equipment marine vessel and ferry in the province Maluku*. *Warta Penelitian Perhubungan*, 28(2), 147-157.
- Smith, T., Garet, S., & Cicchino, J. 2013. *The Effect of Sight Distance Training on the Visual Scanning of Motorcycle Riders: A Preliminary Look*. NHTSA.

- Washington DC. Retrieved from <http://www.nhtsa.gov/staticfiles/nti/pdf/811690.pdf>
- Stikar, J., Hoskovec, J., & Smolikova, J. 2008. *Definition of System*. *Studia Psychologica*, 50(2), 217–226.
- Suhardi. 2012. *Implementasi program keselamatan jalan. Presented at Traffic Victims Day*, November 21th, 2012. Jakarta.
- Vlahogianni, E. I., Yannis, G., & Golias, J. C. 2012. *Overview of critical risk factors in Power-Two-Wheeler safety*. *Accident Analysis and Prevention*, 49(August 2015), 12–22. <http://doi.org/10.1016/j.aap.2012.04.009>
- WHO. 2008. *Speed management: a road safety manual for decision-makers and practitioners*. Geneva, Switzerland: Global Road Safety Partnership.
- WHO. 2011. *Global Plan for the Decade of Action for Road Safety 2011-2020*. Swiss.
- Wong, J. T., Chung, Y. S., & Huang, S. H. 2010. *Determinants behind young motorcyclists' risky riding behavior*. *Accident Analysis and Prevention*, 42(1), 275–281. <http://doi.org/10.1016/j.aap.2009.08.004>
- WYG Engineering. 2012. *Road Safety Inspection Specific Project Result 12B (Revised Final)* July , 2009. Beograd, Serbia.

