

ROAD SAFETY AUDIT AT EXPRESSWAY: UPGRADING PASIR GUDANG  
EXPRESSWAY (F17) JOHOR BAHRU

JALALUDDIN BIN ABAS

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## ***DEDICATION***

*Every challenging work needs self-efforts and blessing of Allah as well as guidance of elders especially those who were very close to our heart.*

*My humble effort I dedicate to my sweet and loving*

*Hjh. Mena binti Mohamed Nor*

*(Mother)*

*Juraida binti Hj. Darani*

*(Wife)*

*Hani Humaira binti Jalaluddin*

*Ali Zafran bin Jalaluddin*

*(Children)*

*Whose affection, love encouragement and prays of day and night make me able to get such success and honour,*

*Along with all hard working and respected  
Lecturers & Staff of Universiti Teknologi Malaysia (UTM) and  
Staff of Consultant Firm related.*

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## ABSTRACT

Road Safety Audits (RSAs) are an effective tool for proactively improving the future safety performance of a road project during the planning and design stages, and for identifying safety issues in existing transportation facilities. Road safety audits is only a study of safety aspects and the auditing process may indicate road safety problems inherent in designs that conform to the road standards. The main objective in this study area is to identify potential safety hazards on new roads project and existing road which have a direct impacts. Road safety audit process is divided in stages from Stage 1 to Stage 5. In this study case, it is only the first 3 stages to consider. Its started with Feasibility and Planning Stage (Stage 1), then continue with Preliminary Design (Stage 2) and ending with Details Design (Stage 3). The auditing process initiated with selection of auditor team, assemble the background information of the project, meeting between client and auditor team. Then the process continue with site inspection by the auditor and follow with producing the finding in a report. Findings from the audit process showing most of the safety requirement in the design was comply with the standards requirement. A minor comment was highlighted in the finding especially for existing road. On the other hand, we can conclude the designer of the new road project had taken all aspect for road safety into account during design stage.

## ABSTRAK

Audit Keselamatan Jalanraya atau juga di kenali sebagai “Road Safety Audit – RSA’ adalah sebagai mekanisma yang proaktif dalam usaha untuk meningkatkan tahap keselamatan pada masa akan datang di dalam pembinaan projek jalanraya semasa peringkat perancangan dan rekabentuk. Ia juga digunakan sebagai kaedah yang digunakan untuk mengenalpasti isu yang melibatkan kemudahan pengangkutan sediada. Audit keselamatan jalanraya hanyalah kajian berkenaan aspek keselamatan dan sebagai pengukur aras pada permasalahan yang melibatkan keselamatan jalanraya yang terdapat di dalam rekabentuk. Ini juga untuk memastikan rekabentuk yang di buat memenuhi kehendak piawaian. Objektif utama di dalam kajian ini adalah untuk mengenalpasti potensi bahaya yang mungkin akan wujud pada pelaksanaan projek jalanraya yang baru dan juga jalanraya sediada yang menerima impak secara langsung daripada projek tersebut. Untuk kajian ini, hanya 3 peringkat pertama pengauditan sahaja dipertimbangkan. Ia adalah Peringkat Perancangan, Rekabentuk Permulaan dan Rekabentuk Terperinci. Proses pengauditan bermula dengan pemilihan pasukan juruaudit, di ikuti dengan mendapat sumber maklumat berkaitan projek. Kemudian pemeriksaan tapak dijalankan dan seterusnya penyediaan laporan audit. Daripada proses pengauditan yang dijalankan, berdasarkan senarai semak, secara keseluruhannya rekabentuk yang dikeluarkan oleh pihak perunding memenuhi kehendak piawaian yang telah di tetapkan. Hanya terdapat sedikit perkara yang perlu di beri perhatian untuk penambahbaikan terutama untuk jalan sediada. Dengan kata lain, pihak perunding yang di beri tanggungjawab untuk merekabentuk projek ini telah mengambil kira segala aspek keselamatan jalan raya.

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## LIST OF ABBREVIATIONS

<i>ADT</i>	-	<i>Average Daily Traffic</i>
<i>ASD</i>	-	<i>Average Sight Distance</i>
<i>ASEAN</i>	-	<i>Association of Southeast Asian Nations</i>
<i>ATJ</i>	-	<i>Arahan Teknik Jalan</i>
<i>FHWA</i>	-	<i>Federal Highway Administration</i>
<i>GDP</i>	-	<i>Gross Domestic Product</i>
<i>IHT</i>	-	<i>Institution of Highways and Transportation</i>
<i>Irap</i>	-	<i>International Road Safety Assessment Program</i>
<i>IRC</i>	-	<i>India Roads Congress</i>
<i>JKR</i>	-	<i>Jabatan Kerja Raya</i>
<i>JKJR</i>	-	<i>Jabatan Keselamatan Jalan Raya</i>
<i>NSW</i>	-	<i>New South Wales</i>
<i>REAAA</i>	-	<i>Road Engineering Association of Asia and Australasia</i>
<i>REAM</i>	-	<i>Road Engineering Association of Malaysia</i>
<i>RSA</i>	-	<i>Road Safety Audit</i>
<i>RSPM</i>	-	<i>Road Safety Plans of Malaysia</i>
<i>RTA</i>	-	<i>Roads and Traffic Authority</i>
<i>RTVM</i>	-	<i>Road Traffic Volume Malaysia</i>
<i>TMP</i>	-	<i>Traffic Management Plan</i>
<i>UNESCAP</i>	-	<i>United Nations Economic Commission for Asia and the Pacific.</i>
<i>VicRoads</i>	-	<i>Victoria Roads</i>

**LIST OF SYMBOLS**

<i>CH</i>	-	<i>Chainage</i>
<i>e</i>	-	<i>Super elevation</i>
<i>kph</i>	-	<i>kilometer per hour</i>
<i>VIPs</i>	-	<i>Vertical Intercept Points</i>

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Introduction**

Road Safety Audit (RSA) is a formal procedure for assessing accident potential and safety performance in the provision of new road schemes and schemes for the improvement and maintenance of existing roads. A road safety audit is a formal examination with intention of identifying road safety deficiencies and areas of risk that could lead to road crashes. New roads must incorporate design and operational safety elements from the start.

RSA is a relatively new aspect of road engineering which requires specialist skill based on a sound knowledge, experience and understanding of Traffic Engineering and Road Safety principle and practices. An important focus of RSA is its consideration of the specific safety needs of all road users.

Road Safety Auditing is not expected to eliminate all or even the majority of accidents but experience in other countries indicates that if it is applied at the various stages of development of new road projects positive benefits can be obtained. Road



Safety Audit costs in the order of 4% to 10% of design costs for new major projects but can provide very much higher benefits to the community in reduced accident costs, and in minimising the trauma suffered by people as a result of traffic accidents.

The basic RSA is the application of safety principles to new project design and improvements to the highway to prevent crashes from occurring or to reduce their severity. The outcome of the audit is the identification of any potential safety issues, together with suggestions on how to address the issues. Additionally, road safety audits are systematic, auditing takes place according to agree upon procedure, in which the parties involved have designated roles in the process. (Terecia W, 2004)

The RSA process requires an objective approach to the assessment of crash risk. The principal method of ensuring this objective is through the independent safety assessment of projects by persons not connected with the original design. Designers and planners need to be familiar with experience conducting road safety engineering technique. (Terecia W, 2004)

## **1.2 Problem Statement**

Road safety audit assess the operation of a road, focusing on road safety as it affects the users of the road. Safety audit is only a study of safety aspects and an auditor may indicate road safety problems inherent in designs that conform to our road standards. This is due to the fact that our road standards are an expression of a socio-economic balance between road safety, accessibility, environment and economy. (IRC: SC: 88-2010)

Base on the Road Traffic Volume Malaysia (RTVM 2011) by Highway Planning Division, Lebuhraya Pasir Gudang should be designed to U5 of JKR standard where the ADT is more than 10,000. It is classified as a divided highway and always had grade separation at all intersections. The road conveys through traffics from residential settlements to the vicinity of the business centers within urbanized area with limited access control.

### **1.3 Aim and Objectives of study**

The aim of this study is to evaluate the RSA process for the road project and existing roads are capable of providing the highest practicable standard of traffic safety for all road users. The following objectives are set forth to reach the aim of the study:

- i) To identify of potential safety hazards on new roads project, at the appropriate stage.
- ii) To identify of hazardous features of an existing road so that they can be eliminated or otherwise treated before they become accident prone locations.
- iii) To ensure that the safety requirements of all road users are explicitly considered in the planning and design.

#### **1.4 Scope of the study**

The Government of Malaysia through implementation agency Jabatan Kerja Raya (JKR) is desirous to improve the road infrastructure of Lebuhraya Pasir Gudang in Johor Baharu, Johor. The project namely FASA 2A stretches from Plentong interchange to Sri Alam / Taman Rinting interchange and this route is known as FT17. The scope of study covers the upgrading of three interchanges; Kempas Interchange, Seri Alam / Taman Rinting Interchange and Masai Interchange. The proposed road upgrading is from 4 lane to 6 lane dual carriageway.

Based on surrounding features, FT17 could be classified a highway and designed under U5 JKR standard where projected ADT is more than 10,000. Fasa 2A is approximately 6.7 km long where residential and industrial are prominent on the left and right sides along the stretch. The location of the proposed project about 7 km north east of Johor Baharu city centre in Johor.

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