TMWZ: BEGIN WITH THE END IN MIND

Ir. Mohd Shahrom bin Ahmad Saman Bahagian Audit & Program Keselamatan Jalan Cawangan Jalan





PERTUBUHAN PROFESIONA JKR MALAYSIA (ProJKRM) CAWANGAN JALAN JABATAN KERJA RAYA MALAYSIA



- Transform nation
- Bind
- New development

TExT-2: TRAFFIC MANAGEMENT AT WORK ZONES 2/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS" SABAK BERNAM

Masalah teknikal punca nahas Kerja naik taraf jalan tidak dilengkapi ciri keselamatan ancam nyawa pengguna

rakal, pusatin

Instruction barried survey dans on

AND INTER COMPANY AND DESCRIPTIONS. AND ADDRESS OF ADDRESS OF

SABAK BERNAM Kernenterion Kerja Roya diorsa memarina kerja-kerja

nuk und bien Persekunan 5 (FR5) yang tidak dilengkopi ciri ciri kraelaman ari terutamanya pada walme

malarr Seorang pendustuk, Azman Zainal Abidin, 51. berkam, serdapat barryak kes keenalangan dalaporkan ber laku sejak perabiraan jalan bookengan dilaksamilan. Menurutsyn, keadaan

its berpunca disebabkan ketiadaan lampu ketipan dan lampu pembinaan yang arculaprepa.

"Saya difahamkan, banyak laporan kes kemalarap an bestaku di separtisng jalan pembinaan ini dari Sabak Bernam menghala ke Tanjung

"Piluk kennenterian ber-Karara. kaltan diharap paratau projek ini, kita tak maklah kemulangan herioks hok on diseisebiom



alarrai hereconakons torrak. "Kalasa persong mososikal mereka mungkin bo-

kecunian trupi masulah sekkels terjatuh jiku gugul kuseni keraderaan. Soya yang me-Sectors prosperse joint mansha pan banyak kak unmys. Roslan Sidek, 51, herkenggerkæsne, møbit hermak kata, jalan FEG bulan saja grduit terpukna dikebaarkan selap pada waktu malam, mahab terpaksa selengeura ko labatroktor jalam raya mojogra

Pernaradu kerena arura, Wabab Zakaria, 54, berkuta, tindakan segera pertu diambili kernjaan bagi menangani masalah berkemaan. Katarnya, seorang anak rakonunya yang manurangnang monadkal meningpal durata apahila terjatuh ketika me

"Says sendiri pan kalma hantar personipang waktu mulam kens paratu hati hast. Kenajaan perka paesa panick mischap is melibulik mynesia pempenana salaca mer konserve. Sebelum Ini.

Change we must!!!



"WORK ZONES - MEETING MOBILITY & SAFETT INC

ROAD ACCIDENTS...



Litigation issues?



What plan shows?



What's on site?



TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

POOR vs GOOD



Proper usage of barrier

Wrong usage of barrier

POOR vs GOOD



POOR vs GOOD



POOR vs GOOD TMP'S







TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"



Confusing Roadmarking





Improper Signages

11/78

Inadequate Buffer

Where do we begin?



PLEASE ARRANGE THE AREAS WITHIN THE WORKS ZONE IN SEQUENCE TO APPROACHING TRAFFIC.



1. Overview

- 2. What's New ?
- 3. Planning

TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES 14/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"



1. Overview

- 2. What's New ?
- 3. Planning

TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES 15/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"



MANAGING TRAFFIC

MOBILITY + SAFETY







1985



ARAHAN TEKNIK (JALAN) 2C/85

TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES 17/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

Bill No. 1 : General & Preliminaries

Senarai Kuantiti Di Bawah Item Pengurusan Trafik

Item No.	Description	Qty	Unit	Rate (RM)	Amount (RM)
1.18.	Maintenance of Existing Roads and Protection of Traffic				
1.18.1	Provide maintenance of existing roads, bridges a relief liverts		L.S.		10,000.00
1.18.2	Provide, maintain and remove temporaly road diversion the temporary works.		L.S.		10,000.00
1.18.3	Provide, maintai and remove temporary traffic sign.		L.S.		20,000.00
1.18.4	Providend maintain traffic control.		L.S.		15,000.00
1.18.5	Locate and provide temporary protection and temporary diversion of public utility installation and other services.		L.S.		30,000.00
					6



TRANSFORMATION

1985



ARAHAN TEKNIK (JALAN) 2C/85

1985



NOTA TEKNIK (JALAN) 23/03

TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES 19/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"



Standard Bill Of Quantities

TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

2016



TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES 21/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

We need to know where we are !

TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES 22/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS" **INSPECTION ON SITE**

Project	Progress	Marks (%)	Score
EK	47%	78.70	В
PI	48%	76.00	В
MI	33%	75.00	В
MRS	77%	74.80	В
TL	5%	69.60	С
P10	72%	68.75	С
PB	57%	67.90	С
SL	37%	55.12	С
WC	15%	40.40	D





WORKSHOP JANUARY 2017

More than 100 participants...



HOW TO CREATE CHANGE?





COURSES FOR SITE TEAM

14 & 15 Mac 2017

- Organised crash course for TMO, supervision team from consultants and JKR



COURSES FOR SITE TEAM

14 & 15 Mac 2017

- Organised crash course for TMO, supervision team from consultants and JKR



TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

COURSES FOR JKR DESIGNERS

25 ~ 27 September 2017













30/78

TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS" **CROSS AUDIT RESULTS**

A ≥ 90 % 70% ≤ B < 90% 50% ≤ C < 70% D < 50%



TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"



CATEGORY BEST TRAFFIC MANAGEMENT PLAN

Assessment Criteria

- 1. Good traffic management system and all processes in place;
- 2. Proper on-site traffic control zones;
- 3. Effective temporary signages;
- 4. Adequate temporary barriers at work zones; and
- 5. Other proper traffic control devices that warn, inform, guide and control traffic



PUBLIC RELATIONS & OUTREACH





NOMBOR PANGGILAN KECEMASAN

HOTLINE ADUAN MASB 019-400 0997

	POLIS	HOSPITAL	BOMBA
TELUK INTAN	05 - 629 9222	05 - 629 8400	05 - 622 1444
PERAK TENGAH	05 - 377 1222	05 - 376 1333	05 - 371 2024
MANJUNG	05 - 689 9222	05 - 689 6600	05 - 688 4444

Project Information Centre (PIC)

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TExT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

INNOVATION DAY

1 ~ 3 Oktober 2017

Booth displaying JKR best practices.





2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"





Review workshops for ATJ 2C/85



TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"



1. Overview

2. What's New ?

3. Planning

TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES 36/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"


TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

37/78

CONTENT	ATJ 2C/86 PINDAAN 2016	ATJ 2C/86 PINDAAN 2017
General Principles of Traffic Management at Work Zones	\checkmark	\checkmark
Strategies for Effective Implementation		\checkmark
Responsibility	\checkmark	
Planning of TMWZ	\checkmark	
Designing Principles TMWZ		\checkmark
Typical Layout	\bigcirc	\checkmark
Taking Off Quantities		\checkmark
Placement and Removal	\checkmark	
Maintenance of Traffic Control Zones	\checkmark	
Report Outline (TMP, TMSR)		\checkmark
Temporary Traffic Control Devices	\checkmark	

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Latest Specification





KETUA PENGARAH KERJA RAYA JABATAN KERJA RAYA MALAYSIA JALAN SULTAN SALAHUDDIN, 50582 KUALA LUMPUR.

JKR/SPJ/2017-S19

TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES 39/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"



ROAD SPECIFICATION & BQ

Latest BQ

BQ9-Traffic Management

Item No.	Code No.	Description	Unit	Qty.	Rate (RM)	Amount (RM)
9.1	C100	TRAFFIC MANAGEMENT PLAN				
		Traffic management plan shall be deemed to				
		include emergency response plan and the associated work.				
9.1.1	C120	Preparation of traffic management plan. Rate to	sum			
82690		include the cost of any survey required, iterature, references, consultations, and the production of the	000000			
		document. It shall also include the cost for the				
		engagement of qualified traffic engineers required for carrying out the respective study and the preparation				
		of the said plan.				
9.2	C130	TRAFFIC MANAGEMENT TEAM / EMERGENCY RESPONSE TEAM				
9.2.1	C132	Traffic management officer.	man-mth			
9.2.2	C133	Supervisor.	man-mth			
9.2.3	C134	Traffic controller.	man-mth			
9.3	C200	TEMPORARY ROAD FURNITURE				
		Items for temporary road furniture shall be				
		deemed to include the supply, installation, maintenance, and removal upon completion.				
		The supply of temporary and furthing shall be				
		deemed to include base preparation, cost of				
		materials, fabrication, and fixing including posts, struts, boits and nuts, base, storage, and				
		transportation.				
		Installation of temporary road furniture shall be				
		the contractual boundaries and its vicinities that				
		is affected by the traffic management plan.				
		Temporary road furniture shall be deemed to				
		include cost for the inspection, immediate repair				
		stolen items throughout the duration of the				
		construction, and removal upon completion.				
		Page Total carried to Summary of Bill No. 9				
iete where esigner to	e not applic decide wh	able BQ9 - 1/10				
	* Delete wi ** Designe	nere not applicable r to decide which is applicable	BQ9 - 2/10			
	-	and the second se	_	_		
		BOR				
-	-	809 - 4/10				



Definition

TMWZ – Traffic Management at Work Zone



TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"



Definition

TMP – Traffic Management Plan

Refers to a compiled document consisting of method statement of Traffic Management, work programme, Traffic Control Plan, organization chart etc...

TMO – Traffic Management Officer

Refers to Contractor's representatives responsible for all matters related to the traffic management, safety of the travelling public and construction workers within the limits of the construction works/contract.

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Definition

TCP – Traffic Control Plan

Refers to the detailed drawing that shows the placement of Traffic Control Devices according to the construction sequence.

TCD – Traffic Control Devices

Traffic control devices are markers, signs, channelizing and signal devices. They are used to inform, warn, guide, or regulate traffic movement and control vehicle speeds. Traffic control devices also provide important information to users about detours and traffic delays.



Traffic Categories

TABLE 4.2: TRAFFIC CATEGORIES TRAFFIC CATEGORIES		
ROAD CLASSIFICATION	SPEED PROFILE	SPEED
	Low Speed	< 60 km/hr
URBAN	High Speed	> 60 km/hr
	Low Speed	< 70 km/hr
RURAL	High Speed	> 70 km/hr
	Low Speed	< 90 km/hr
EXPRESSWAY	High Speed	> 90 km/hr

Online quiz result?

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TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

Traffic Categories vs Length of Areas



46/78

Construction Duration Categories

CONSTRUCTION DURATION CATEGORIES		
CLASSIFICATION	DURATION	
Temporary Lane closure		
*Flagmen are always required during temporary lane closure	< 1 Day	
Short Term Diversion	> 1 Day	
	< 1 Month	
Long Term Diversion	> 1 Month	

TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES 47/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"



Construction Duration vs TCD (Temporary Lane Closure)



TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES

"WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

Construction Duration vs TCD (Road Diversion)





IMPLEMENTATION STRATEGIES

- 1. Set up monitoring framework
- 2. Set up working teams
- 3. Design localised TCPs
- 4. Use standardized approach
- 5. Prepare TMSR
- 6. Audit during construction

Framework to Monitor Traffic Management at Work Zone



TExT-2: TRAFFIC MANAGEMENT AT WORK ZONES

"WORK ZONES - MEETING MOBILITY & SAFETY NEEDS"

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WORK ZONE LENGTH

Work zone not including surcharge area

- Length < 5km (rural)
- Length < 2km (urban)

Excavation

- Length < 200m
- Nos < 4

(T-2: TRAFFIC MANAGEMENT AT WORK ZONES 53/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

Examples of new Temporary Traffic Equipment



Variable Massaging System (VMS)



Delineators on barrier

54/78



TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"





TExT-2: TRAFFIC MANAGEMENT AT WORK ZONES "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

Inspection procedure minimum 2 times per day.

		JKR/BORAN	GPEMERIKSAANR
BORA	NG PEMERIKSAAN RUTIN ZO	N KERJA	
			44:11
Projek : Projek Acenaitia	-af Laburan F7060 Damai L	and - Gerghard Knigh	may 15
Kontraktor : MEGA SASA C	UN. CHO.	Tarikh :	TTT.
Name TAC AN/CAN SVAR	DAN VIERS	- Mars . 8.50p	7
	10,41 14101		
1 ZON A - KAWASAN AMARAN AWAL (AD	ANCE WARNING AREA)	CATATAN	CAR. 1/2
Papan Tanda Pemberitahuan	A1 A2 A3 A4 A5 A6 A7	Apark	
. Papen Tanda Amaran Awal (AWAS)	A1 A2 A3 A4 A5 A6 A7	Bail	
L Papan Tenda Orang Bekerja	A1 A2 A3 A4 A5 A6 A7	Bail	1
v. Papen Tande Lorong Semplt	A1 A2 A3 A4 A5 A6 A7	NA	
. Pepen Tanda Had Laju	A1 A2 A5 A4 A5 A6 A7	1.49/1	
1. Papen Tanda Anak pansh	A1 A2 A3 A4 A5 A6 A7	Bark	
II. Penanda Garisan Jalan Sementara	G1 G2	1 Not	
II. Kendaan Jalan	11 12 13 14	Baile .	
2 ZON 8 - KAWASAN PERALIHAN (TRANSIT	TON AREA)	CATATAN	CAR 1/2
. Pepen Tende Anak paneh (3 Bilangan)	A1 A2 A3 A4 A5 A6 A7	1	
Arrow Flasher / Chevron light	K1 K2 K3	M	
. Blinkers (Selang 10m)	81 82 83 84	l'	
. Reflective Disc / Delineator String		Baile	
Plastic Barrier	D1 D2 D3 D4 D5 D6	Bail	1
Concrete Barrier	E1 E2 E3 54 E5 E6	Jaile	1
L Kon Keselamatan	F1 F2 F3	1 Ja,t	
II. Pengawai Bendera	H1 H2 H3	Jak	
c. Robotic Flagman	11 1	NA	
Penanda Gerisan Jalan Sementare	G1 G2	NA	
L. Keedaan Jalan	11 12 13 14	Baile	
ZON C - KAWASAN KELEGAAN (BURTER A	REA)	CATATAN	CAR 1/2
Papan Tanda (Orang Bakarja / Had Laju)	A1 A2 A3 A4 A5 A6 A7	Box.	
. Blinkers	81 82 83 84	Bart	
L Reflective Disc / Delineator String	a a	fac	
. Plastic Borrier	D1 02 D3 D4 05 06	Bail	
Concrete Barrier	E1 E2 E3 E4 E5 E6	Bail	
Kon Keselamatan	F1 F2 F3 '	Hail	
Penanda Garisan Jalan Sementara	G1 G2	M	1
II. Pengewel Bendere	H1 H2 H3	Ball	1
Keadaan Jalan	11 12 13 14	- CH 950	CAR 2
	11 12 12	10	

_					
4 8	SON D - RAWASAN KERJA (IMDIK AREA)	President in the official states in	CATATAN	CAR 1/3	
LS	Papan Tanda (Orang Bekerja / Had Laju)	A1 A2 A3 A4 A5 A6 A7	Beik.		
11. 1	Blinkers	B1 B2 B3 B4	NX		
III. /	Reflective Disc / Delineator String	aa	Bark		
IV. F	Plastic Barrier	D1 D2 D3 D4 D5 D5	Parks drownes repi	CAR G	10-100
v. (Concrete Barrier	E1 E2 E3 E4 E5 E6	Baik		
VI. P	renanda Garisan Jalan Sementara	G1 G2	NA		
vii. 1	esoean Jalan	11 12 13 14	Sail -		
5 2	ON E - KAWASAN TAMAT (TERMINATION	(ABEA)	CATATAN	CAR. 1/2	
	apan Tanda Mohon Maaf	A1 A2 A3 A4 A5 A6 A7	N·A		
M Di Na Ta Di Ta	Juntara Projek aklumat tambahan / gambar dilampirkan seciakan Oleh Pegewai Pengurusan Trafik ma : ANISAN SVERI maki oleh Pengung Zoglak (ZM); ma : ANISAN SVERI mbil Tindakan Oleh TMO; ma : ANISAN SVERIAM VISION	: Ye (TMO): (TMO): EXTENSION EXTENSION EXTENSION EXTENSION EXTENSION EXTENSION	Tidak		
Dia Na	TRAFFIC MANAGEMENT OFFICER				

"WORK ZONES - MEETING MOBILITY & SAFETY NEEDS"

Possible automation in the future?

57/78



1. Overview

2. What's New ?

3. Planning



DESIGN PHASE

- Road Design Engineers to prepare overall TCP design.
- Road Design Engineers to prepare Bill of Quantities.
- Road Safety Auditor to audit in RSA Stage 3.

PRE-CONSTRUCTION PHASE

- Contractor to prepare TMP proposal for the project.
- Contractor appoints TMO.
- Road Safety Auditor to audit the TMP in RSA Stage 4 Part 1.

CONSTRUCTION PHASE

- SO/PD sets up TMWZ Monitoring Framework.
- Contractor to establish TMT, ERT (if required), and prepare TCP and TMSR.
- Road Safety Auditor to audit Traffic Management during construction.

TMWZ WORKFLOW







ROME WAS NEVER BUILT IN A DAY

 TExT-2: TRAFFIC MANAGEMENT AT WORK ZONES
 61/78

 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

PLANNING



PLANNING



Step 1: Assemble Data

1. Site visit

- i. Existing facilities removal?
- ii. Inventory of existing features
- iii. Flow pattern
- iv. Potential problems
- 2. Desk study traffic & accident data

A. <u>Basic Information</u>

Description of Construction Project

- Type of work

- Roadway encroachment *should include the space required by the* **work activities and equipment**. The **safety buffer** required for adequate work site protection and the physical space occupied by the **barricades or other traffic control devices**.

- Limits of work
- Tentative work sequence and work programme
- Estimated cost
- Construction category

Traffic Data

- 24 hour volume counts
- Roadways geometrics
- Speed data
- Description of potential detour routes

B. Additional Information

Roadway Data

- Right of way limitations
- Horizontal and Vertical profiles
- Type and location of traffic control devices
- Adjacent lane use

Traffic Data

- Daily and seasonal volume variations
- Intersection and Interchange turning movement counts
- Volume of trucks
- Signal timing data
- Accident history





Step 2 : Determine Traffic & Construction Duration Categories

TABLE 4.2: TRAFFIC CATEGORIES TRAFFIC CATEGORIES			
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TABLE 6.2: THE CONSTRUCTION DURATION CATEGORIES			
CONSTRUCTION DURATION CATEGORIES			
CLASSIFICATION	DURATION		
Temporary Lane closure			
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Chart Tarra Diversion	> 1 Day		
Short Term Diversion	< 1 Month		
Long Term Diversion	> 1 Month		

TEXT-2: TRAFFIC MANAGEMENT AT WORK ZONES 68/78 "WORK ZONES – MEETING MOBILITY & SAFETY NEEDS"

PLANNING



Step 3 : Determine Extent Roadways Occupancy

- 1. Number & width of lanes maintain!!!
- 2. Factors ?
 - i. Total project length
 - ii. Length of occupied roadway
 - iii. Portion to be closed
 - iv. Number of working days
 - v. Cross section
 - vi. ROW

PLANNING



Step 4 : Identify Feasible Work Area Types

Identify possible options ...

- 1. Lane Narrowing
- 2. Lane Closure
- 3. Contra Flow
- 4. On-site or off-site Detour
- 5. Temporary Bypass
- 6. Intermittent Closure
- 7. Use of Shoulder or Median
PLANNING



73/78

Step 5 : Impact Analysis

Evaluating criterias

- 1. Safety
- 2. Traffic Flow
- 3. Cost
- Volume vs Capacity (Not for temporary and short term diversion)

PLANNING





- 1. Read the documents and suit to your project.
- 2. Understand roles and responsibilities.
- 3. Execute the monitoring frameworks (TMP, TMSR, RSA, Inspection, etc)



- 1. The improvement of TMWZ implementation is **everybody responsibility** and requires **holistic** approach
- Revised ATJ 2C/85 focuses on principles rather than templates TCP & New SPJ-S19 focuses on material specifications, method of installation and application requirement
- 3. There are **7 steps** in the planning of TMWZ



THANK YOU



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