



**Government of the Republic of
The Union of Myanmar
Ministry of Construction**

***PLENARY MEETING ON ROAD
INFRASTRUCTURE DEVELOPMENT IN MYANMAR***

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PUBLIC WORKS
MINISTRY OF CONSTRUCTION**

**30th Japan Road Conference
Toshi Center Hotel**

October 30~31,2013



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Myanmar Profile

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Public Works, Ministry of Construction

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Major Projects Coming & Required technology

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Conclusion



Myanmar Profile

Population

60 Million (2010-2011)

Road Length

1423956 km (2011)

Area

676578 km²
936 km (East - West)
2051 km (North - South)

Number of Registered Vehicles

- 2476672 (June 2012)

Neighboring Countries

- Bangladesh, India, China, Laos, Thailand





Myanmar Profile

Myanmar National Data

Composition

- 7 States & 7 Regions
- 138 National Races

Capital City

- Naypyitaw (Government)
- Yangon (Economic)
- Mandalay (Culture)

Official Language

- Myanmar

Climate

- Seasons (Summer, Raining, Winter)
- Temperature (Mean max: 31°C)
- Humidity (Mean ~ 70 %)
- Avg. Annual rainfall (~ 1800 mm)

Economy

- Currency – Kyat (1 US \$ ~ 900 kyats)
- Per capita GDP – 700 US \$ (March 2011)



COUNTRY EXISTING SITUATION

Myanmar in Transition

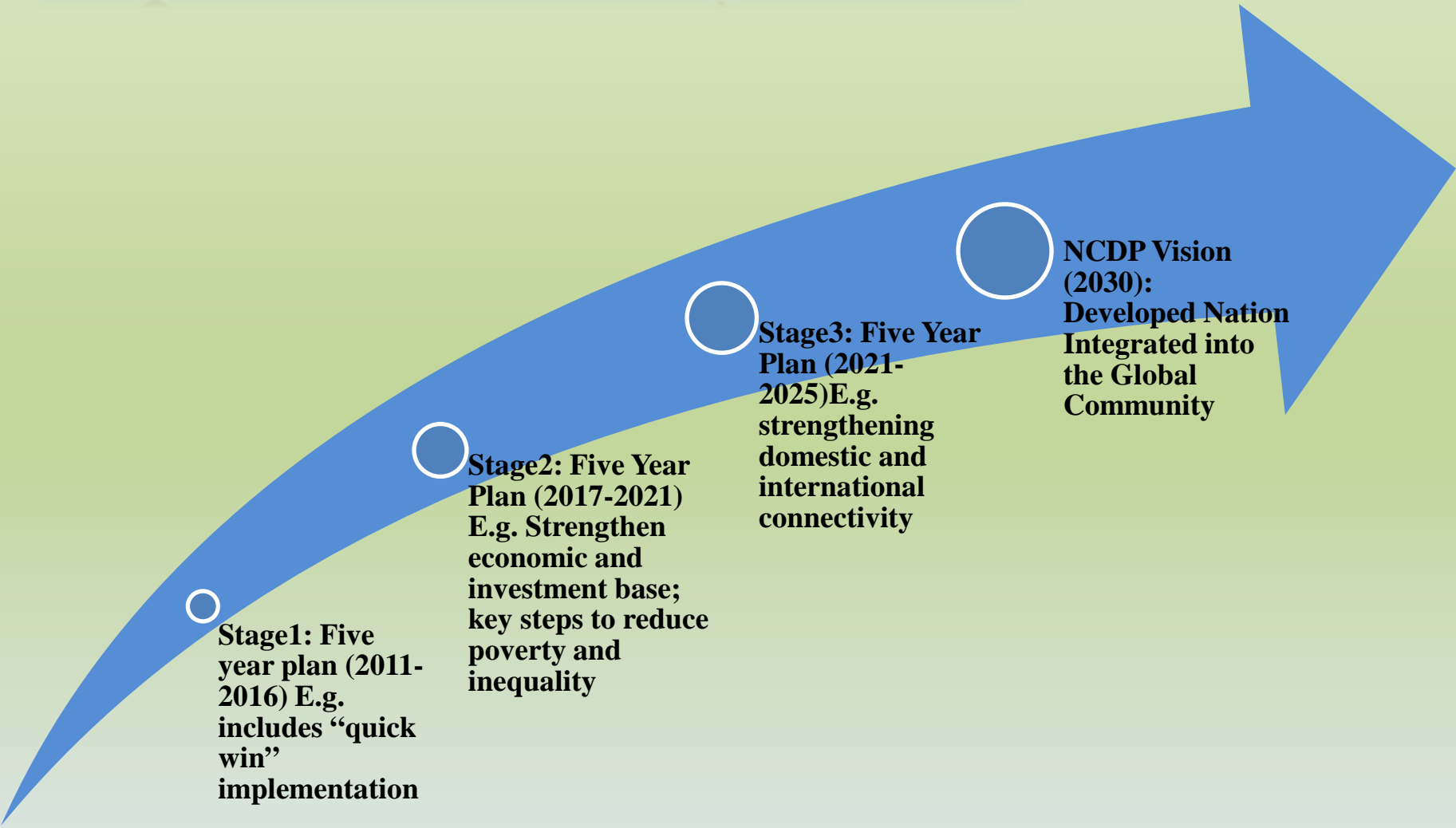
The New Government assumed power and embarked on a path of democratic and market oriented economic reforms.(2011, March)

- ❖ Political reform
- ❖ Social reforms
- ❖ Economic reforms

Reform Strategy with people centered approach.

- ❖ Drafting on National Comprehensive Development Plan
- ❖ Economic Policies
 - Sustaining agriculture development towards industrialization and all round development;
 - Balanced and proportionate development among regions and states with equal share of budget and taxation, foreign aid and foreign and local investment;
 - Inclusive growth for entire population;
 - Compilation of quality and accurate statistics.

Long Term Vision and Policy Process



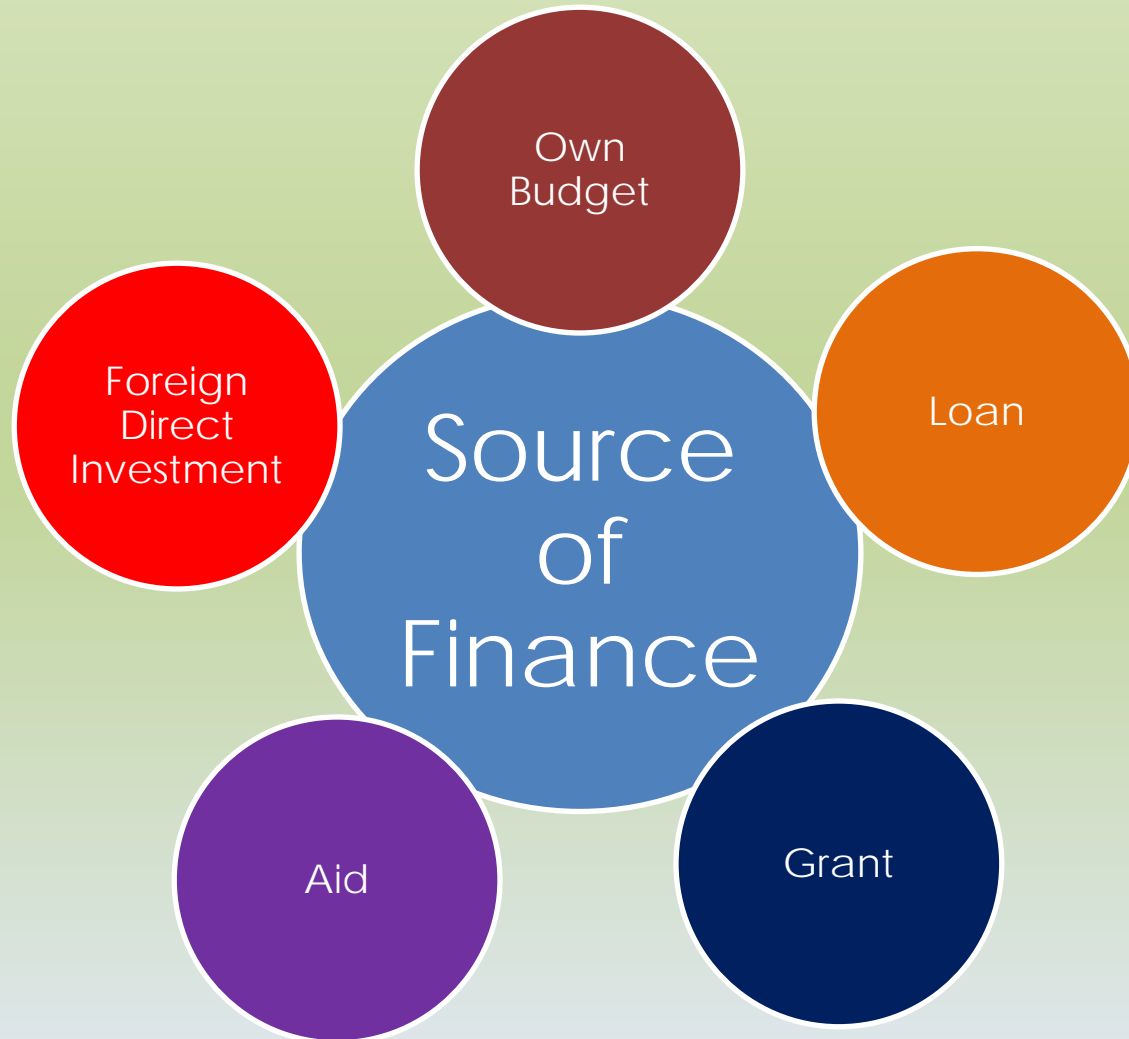
Stage1: Five year plan (2011-2016) E.g. includes “quick win” implementation

Stage2: Five Year Plan (2017-2021) E.g. Strengthen economic and investment base; key steps to reduce poverty and inequality

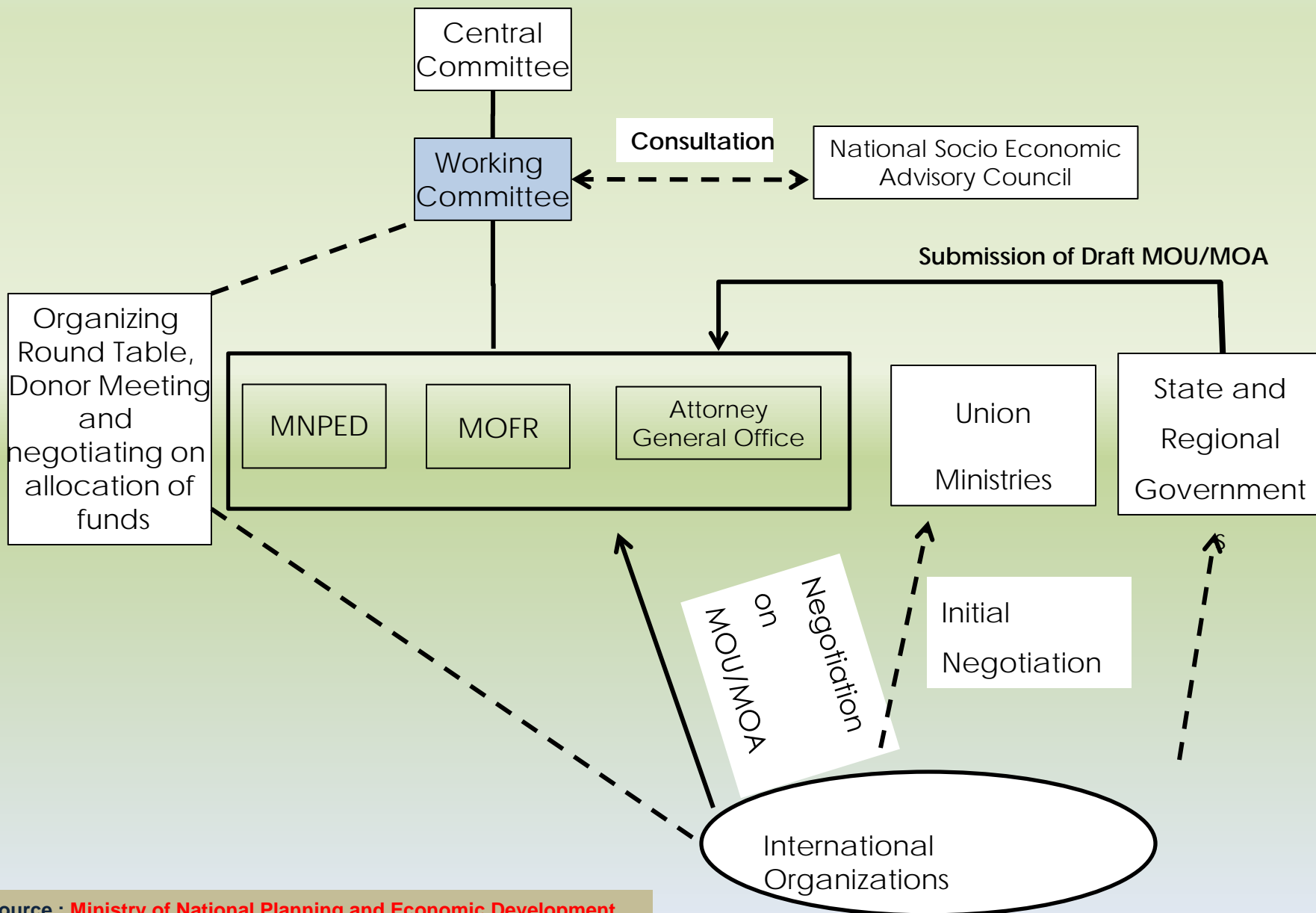
Stage3: Five Year Plan (2021-2025) E.g. strengthening domestic and international connectivity

NCDP Vision (2030): Developed Nation Integrated into the Global Community

Source of Finance : Consideration for the best allocation of the sources of finance



The process and procedure for Foreign Aid Negotiation



**PUBLIC WORKS, MINISTRY OF
CONSTRUCTION**

Ministry of Construction

Public Works

Department of
Human Settlement
and Housing
Development

Road

Bridge

Building

Airfield



Organization Structure

Public Works

Managing Director

Deputy Managing Director (*Admin*)

Deputy Managing Director (*Planning*)

Deputy Managing Director (*Works*)

Deputy Managing Director (*Maintenance*)

General Manager

Deputy Chief Engineer

Chief Engineer

Chief Engineer

Chief Engineer

- Administration
- Finance
- Trades
- Productions

- Architecture
- Water & Sanitary
- Electrical
- Mechanical
- Planning, Design, Quantity Survey & Research, Stores

- Roads
- Buildings
- Airfields

Upper Country

- Roads
- Buildings
- Airfields
- Ygn-Mdy Expwy

Lower Country

- Bridges

Road Administration System of Myanmar

National Transport Policy

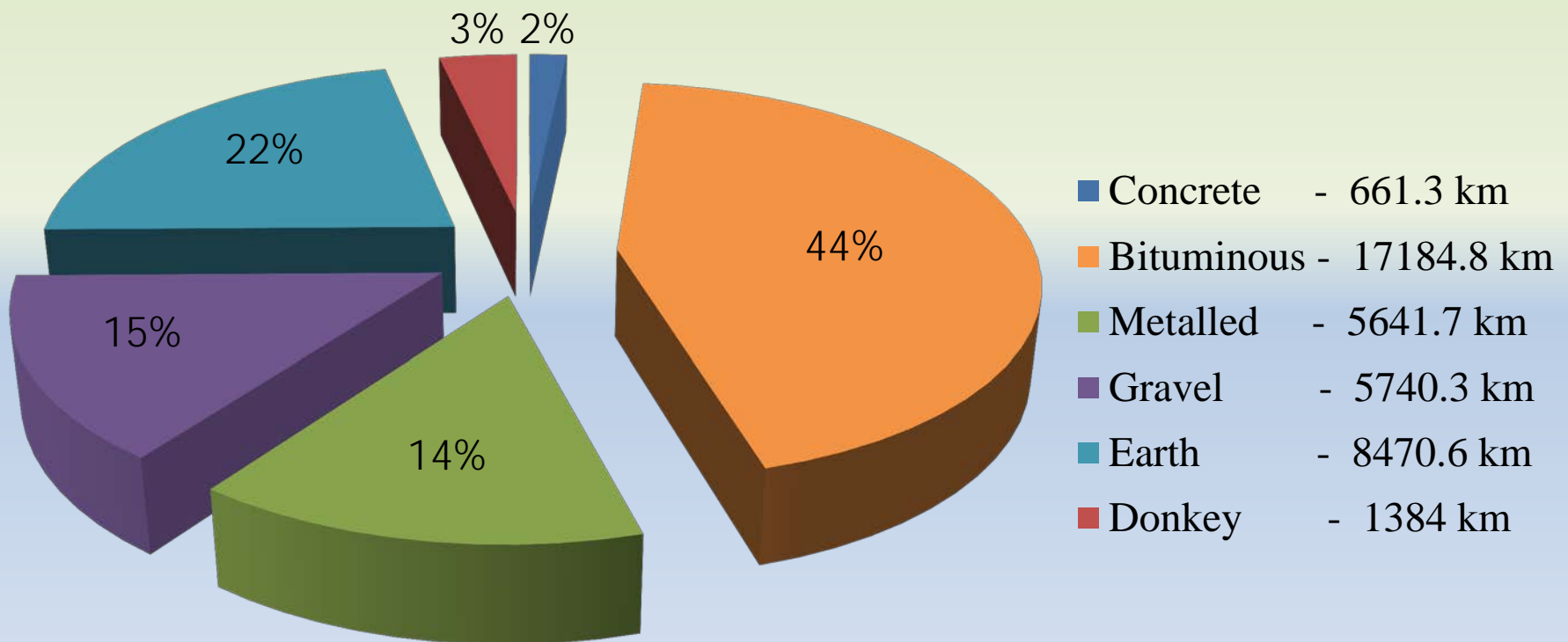
- Union Highway Network Master plan with 36 roads from north-south and 45 roads from east-west will cut-across 7 Regions & 7 States
- Priorities are given to the development of each and every region, to increase contact and friendship, and build reconsolidation of national races.
- Extend and upgrade to the existing roads mostly running north to south and construct new ones running from east to west all over the Union.
- Facilitate and promote economic activities, particularly trade and tourism, between Myanmar and other countries.

Total Road Length in the Republic of the Union of Myanmar 2012

No.	Department	Concrete Road (Km)	Bituminous Road (Km)	Gravel Road (Km)	Metalled Road (Km)	Earth Road (Km)	Donkey Road(Km)	Total (Km)
1	Ministry of Construction, Public Works							
	Expressway & Highways	611.7	11,733.0	2,440.8	2,700.3	1,973.5	44.1	19,503.2
	Regional & State Roads	49.7	5,451.8	3,299.6	2,941.4	6,497.1	1,340.0	19,579.5
	Sub-total	661.3	17,184.8	5,740.3	5,641.7	8,470.6	1,384.0	39,082.7
2	Ministry of Border Areas							
	Urban Road	6.6	4,880.7	2,215.5	660.8	3,509.0	-	11,272.6
	Village & Border Road	120.1	4,073.0	17,041.5	4,976.7	55,888.5	-	82,099.9
	Sub-total	126.7	8,953.8	19,257.0	5,637.5	59,397.5	-	93,372.5
3	Yangon City Development Committee	1,239.7	1,747.5	12.9	454.9	472.9	-	3,928.0
4	Mandalay City Development Committee	10.8	573.4	119.7	-	309.8	-	1,013.8
7	Naypyitaw City Development Committee	246.1	129.3	43.0	734.9	1,130.8	-	2,284.1
6	Directorate of Military Engineers	393.4	61.8	605.3	166.4	6,822.7	-	8,049.5
7	Ministry of Electrical Power	48.3	88.5	542.1	-	280.2	-	959.2
	Total	2,726.3	28,739.1	26,320.4	12,635.4	76,884.6	1,384.0	148,689.9

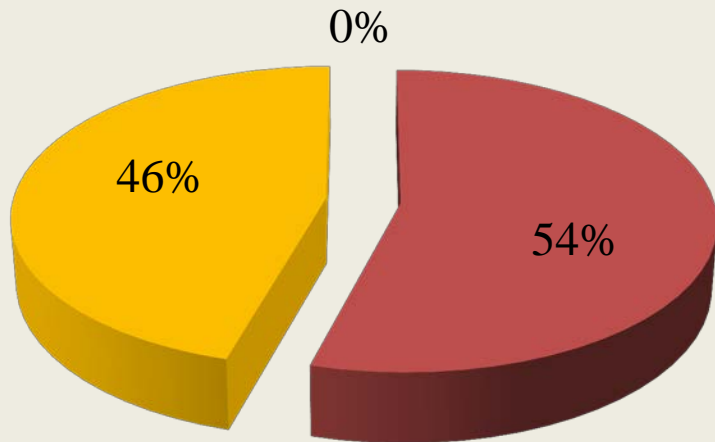
Roads managed by Ministry of Construction

Total road length – 39,082.72 km (March, 2012)

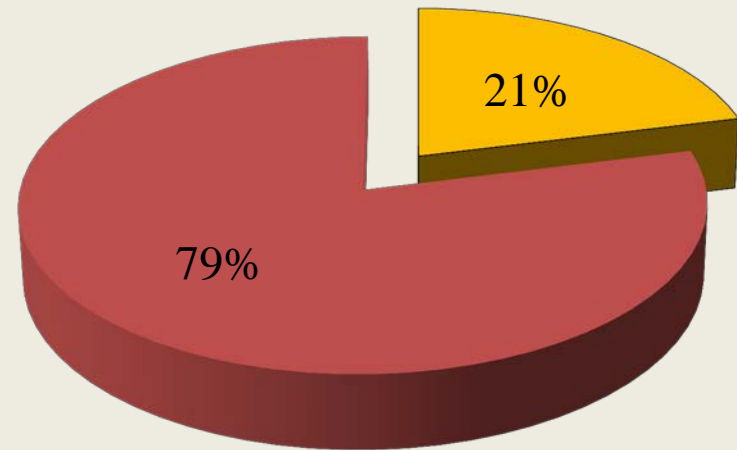


Ratio of Paved and Unpaved Road

Public Works



Whole Country



■ Paved

(As of March, 2012)



Road Development Plan (30 years)

1st Five Year Plan (2001 ~ 2006) *[completed]*

2nd Five Year Plan (2006 ~ 2011) *[completed]*

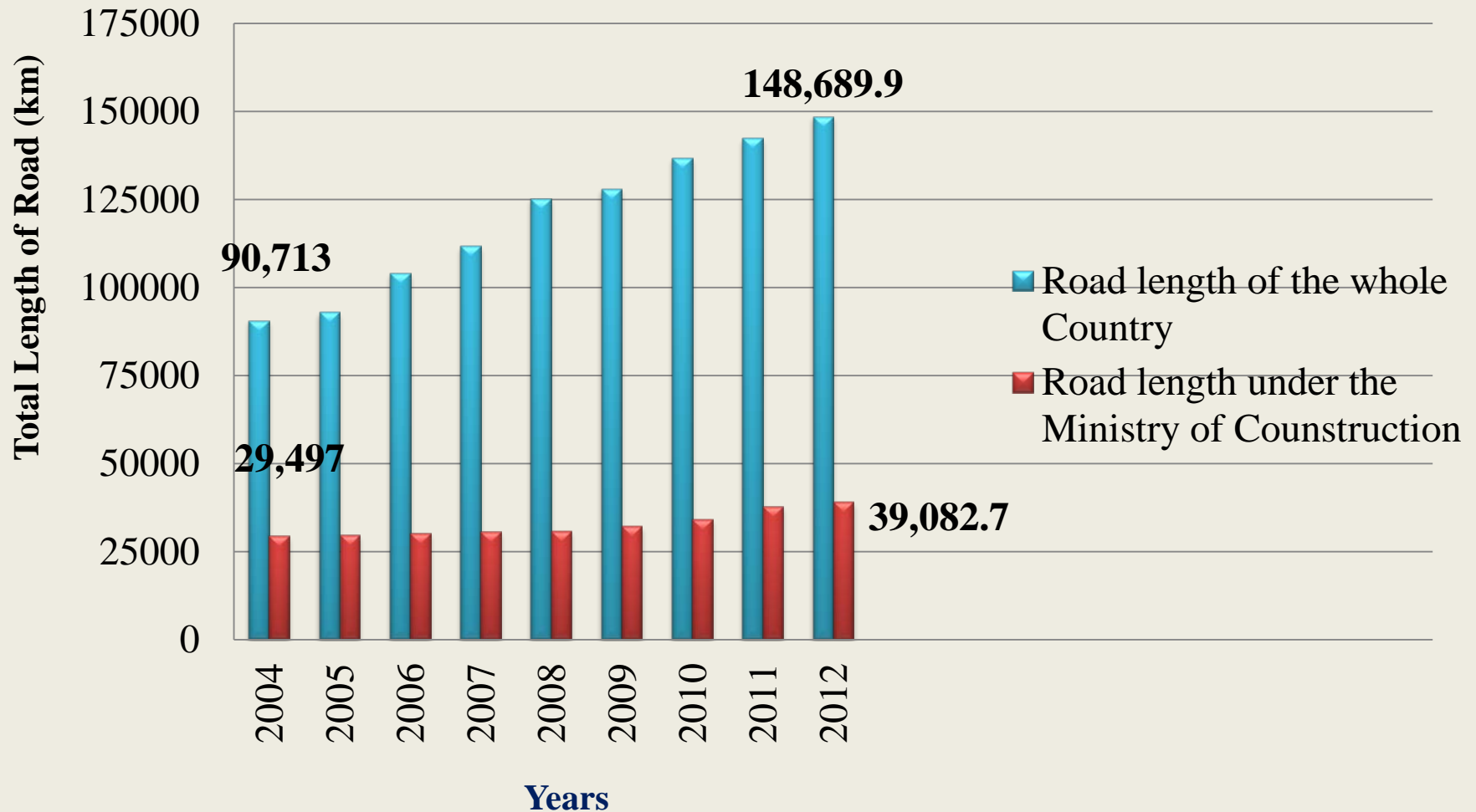
3rd Five Year Plan (2011 ~ 2016) *[in progress]*

4th Five Year Plan (2016 ~ 2021) *[prepared]*

5th Five Year Plan (2021 ~ 2026) *[prepared]*

6th Five Year Plan (2026 ~ 2031) *[prepared]*

ROAD PROGRESS IN MYANMAR (March, 2012)



UNION HIGHWAYS OF INTERNATIONAL CONNECTIVITY

Sr. No.	Itinerary	Road Length (km)	Road Width 7.3 m (done) (km)	Road Width 7.3 (to do) (km)	Remark
1	Myawadi-Kawkareik-Phaan-Thaton-Payagyi-Taungoo-Pyinmana-Meiktila-Mandalay-Monywa-Gangaw-Kale-Tamu (AH-1)	1577	963 (61 %)	571 (36 %)	
2	Tachileik-Kengtung-Taunggyi-Meiktila-Mandalay-Monywa-Gangaw-Kale-Tamu(AH-2)	804	313 (39 %)	491 (61 %)	
3	Kengtung-Mongla (AH-3)(GMS)	90	-	90 (100 %)	
4	Mandalay-Lashio-Hseni-Kutkai-Muse(AH-14) (GMS) (B.O.T)	460	282 (61 %)	165 (36 %)	
5	Loilem-Laihka-Pankaytu-Shipaw(AH-111) (GMS)	240	-	240 (100 %)	
6	Thaton-Mawlamyine-Ye-Dawei-Myeik-Kawthoung(AH -112)	1120	184 (16%)	936 (84 %)	
7	Lenya-Kalonioi(AH-112) (Item-6)	-	-	-	
8	Dawei-Sinbhyudaing(Tikee) (AH-123) Dawei SEZ (to do)	135	-	135 (100 %)	
9	Tamu-Bagan-Myawadi(India-Myanmar-Thailand)	1321	532 (40 %)	789 (60 %)	
	Total	5747	2274 (40 %)	3417 (59 %)	MOBA (1 %)

Road Technology of Myanmar

DEVELOPMENT OF ROAD TECHNOLOGY

For Design, Construction and Maintenance the following Manuals have been used:

- Geometric Design Standards (Public Works),
- Structural Design (Overseas Road Note 31, TRRL, UK)
- Construction Manual prepared by Road Research and Development Project with the aid of UNDP,
- Maintenance Manual (Public Works)

GEOMETRIC DESIGN STANDARDS FOR HIGHWAYS (PUBLIC WORKS)

Design Class	Township Road		Divisional Road		Highway		Super Highway	
	D-VI	D-V	D-IV	D-III	D-II	D-I		
	Single Lane		2 Lanes		4 Lanes		6 Lanes	
					Multilane	Divided (2)	Multilane	Divided (3)
1. Annual Average Daily Traffic	Under 50	50-200	200-500	500-2500	Over 2500		Over 5000	
a. Flat Country	50	50	60	60	70	70	70	70
2. Design Speed (MPH)	40	40	50	50	60	60	60	60
b. Rolling Country								
c. Mountainous Country	30	30	40	40	50	50	50	50
3. Number of Lanes	1	1	2	2	4	4 divided	6	6
4. Width of Lane (feet)	12	16	9	11 (min.)	11 (min.)	12	12	12
				12 (desirable)	12 (desirable)			
4-A. Right of Way (feet)	100	100	100 (min.)	100 (min.)	150	300	300	300
			150 (desirable)	150 (desirable)				

GEOMETRIC DESIGN STANDARDS FOR HIGHWAYS (PUBLIC WORKS)

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		D-VI	D-V	D-IV	D-III	D-II	D-I		
		Single Lane		2 Lanes		4 Lanes		6 Lanes	
						Multilane	Divided (2)	Multilane	Divided (3)
5. Minimum Width of Shoulder (feet)	a. Flat Country	4 (min.)	6	8	8	10	10	10	10
	b. Rolling Country	6 (desirable) 4 (min.)	6	8	8	10	10	10	10
	c. Mountainous Country	6 (desirable) 4 (min.)	4	6	6	8	8	8	8
6. Minimum Width of Formation (feet)	a. Flat Country	20-24	28	34	40	68	68	92	46 each
	b. Rolling Country	20-24	28	34	40	68	68	92	46 each
	c. Mountainous Country	20	24	30	36	64	64	92	46 each
7. Maximum Grades (%)	a. Flat Country	5	4	3	3	3	3	3	3
	b. Rolling Country	6	5	4	4	4	4	4	4
	c. Mountainous Country	8	6	6	6	6	6	5	5
Notes									

Geometric Design of Road (Public Works)

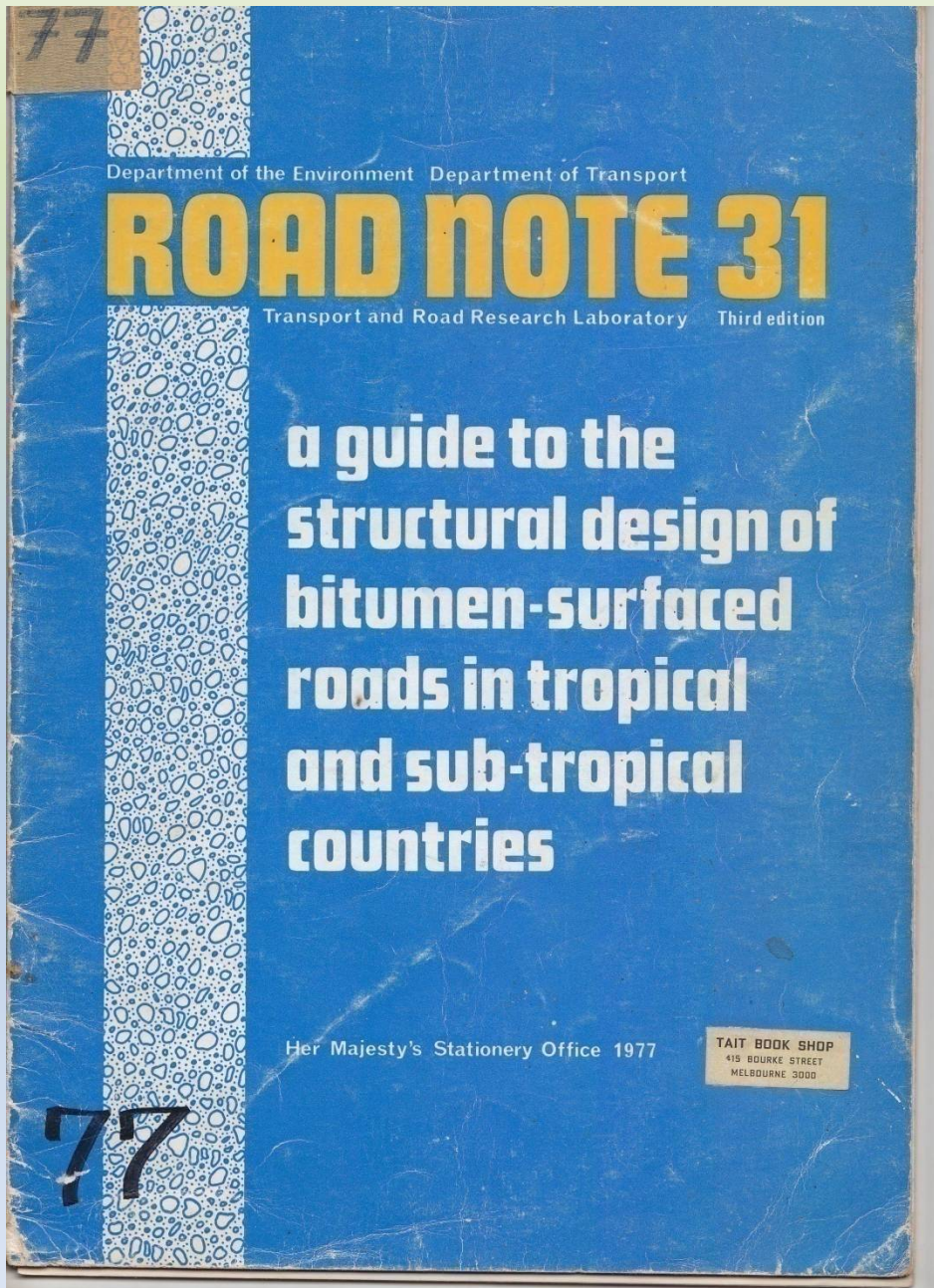
Class	AADT	No. of lane	Pavement/ Lane Width
D-VI	< 50	Single Lane	12'
D-V	50~200	Single Lane	16'
D-IV	200~500	Two Lane	9'
D-III	500~2500	Two Lane	11' (minimum) 12' (desirable)
D-II	> 2500	Four Lane	11' (minimum) 12' (desirable)
D-I	> 2500	Four Lane (Divided)	12'

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D-I	> 2500	Four Lane (Divided)	12'

Structural Design of Roads

- For Flexible Pavement Design, Public Works is using Road Note 31 and Oversea Road Note 31 .
- Both come out from the research works made by Transport and Road Research Laboratory (U.K.).
- For Rigid Pavement Design, Road Note 29, Transport and Road Research Laboratory, U.K. is adopted.

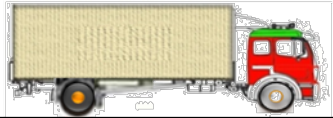
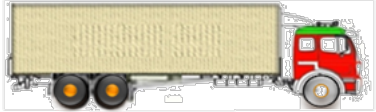

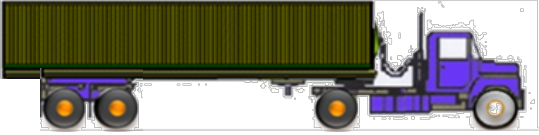
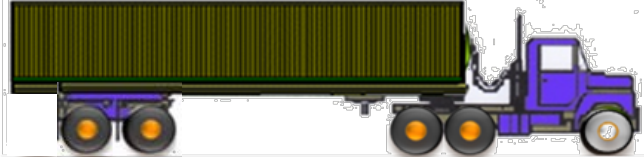
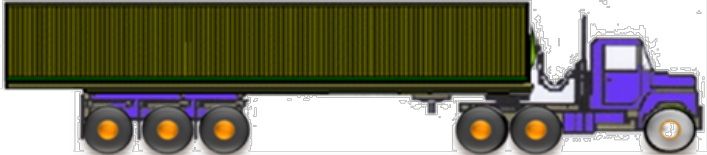


Road Note 31 Method

Public Works mostly uses this method because

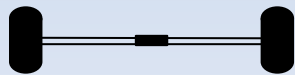
- (1) Our country is a **tropical country**,
- (2) This method is **not complicated**,
- (3) Testing facilities are **available** in our laboratory &
- (4) This method covers the design requirements of most non-urban roads in **developing countries**.

Weights Diagram

Trucks Variety	Weights Permission (Before 2015 / 2015 and After 2015)
	<p style="text-align: center;">16 / 15 Tons Two axles , common(6)Tyres</p>
	<p style="text-align: center;">23 / 21 Tons Three axles , common(10)Tyres</p>
	<p style="text-align: center;">30 / 25 Tons Four axles , common(12)Tyres</p>
	<p style="text-align: center;">33 / 31 Tons Four axles , common (14) Tyres</p>
	<p style="text-align: center;">46 / 45 Tons Five axles , common (18) Tyres</p>
	<p style="text-align: center;">51.5 / 48 Tons Six axles, common (22) Tyres</p>



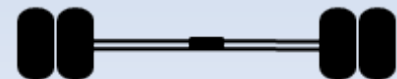
Front wheel



Front axle



Rear wheel



Rear Axle

Overweight Vehicles Control in Myanmar

➤ Overweight vehicles are one of the main factors to shorten the design life of road



➤ Started overweight vehicles control in Myanmar in August 2010



Earth Road



Gravel Road



Paved Road



Paved Road



ASEAN Standard of Highway Classification



Primary

4 or more lanes with asphalt/ cement concrete pavement

Class I

4 or more lanes with asphalt/ cement concrete pavement

Class II

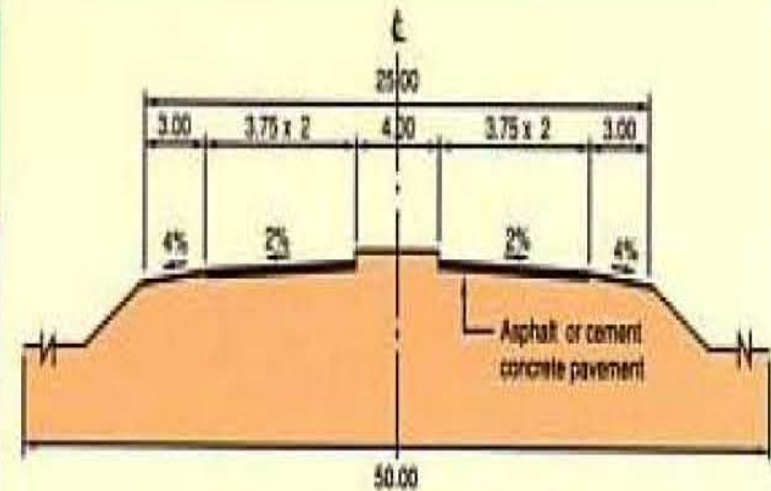
2 lanes with asphalt/ cement concrete pavement

Class III

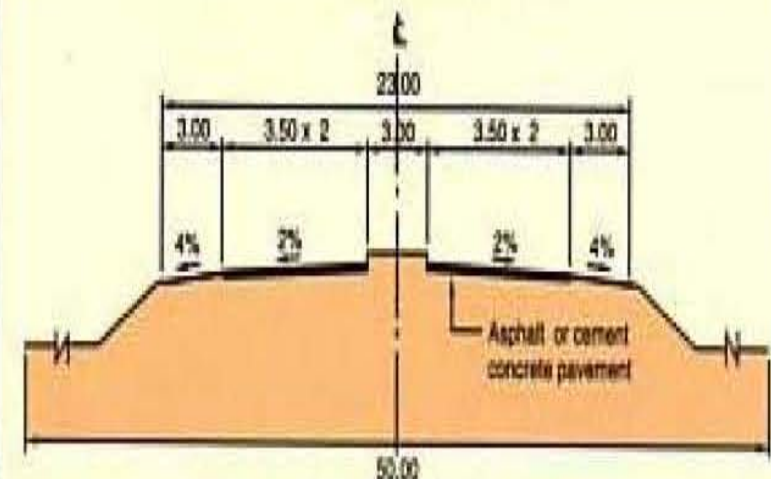
2 lanes with double bituminous treatment pavement

Asian Highway Standard

Highway classification		Primary (Access controlled motorway)				Class I (4 or more lanes)			
		L	R	M	S	L	R	M	S
Terrain classification		L	R	M	S	L	R	M	S
Design speed (km/h)		120	100	80	60	100	80	60	
Width (m)	Right of way	50				40			
	Lane	3.50				3.50			
	Shoulder	3.00	2.50		3.00	2.50			
	Median strip	4.00	3.00		3.00	2.50			
Min. horizontal curve (m)		520	350	210	115	350	210	115	
Pavement slope (%)		2				2			
Shoulder slope (%)		3-6				3-6			
Type of pavement		Asphalt/cement concrete				Asphalt/cement concrete			
Max. super-elevation (%)		10				10			
Max. vertical grade (%)		4	5	6	7	4	5	6	7
Structure loading (minimum)		HS20-44				HS20-44			



PRIMARY (4 LANE, LEVEL TERRAIN)



CLASS I (4 LANE, LEVEL TERRAIN)

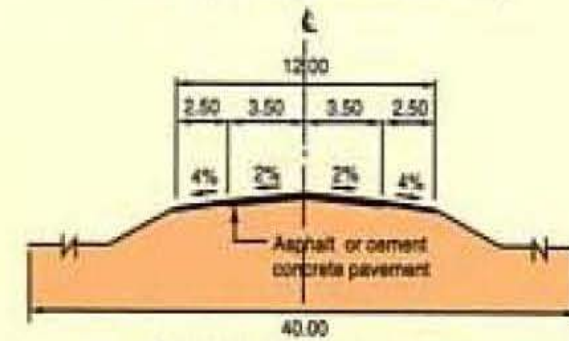
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Asian Highway Standard

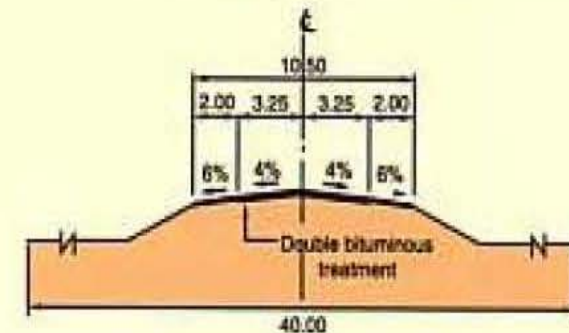
Highway classification		Class II (2 lanes)				Class III (narrow 2 lanes)			
Terrain classification		L	R	M	S	L	R	M	S
Design speed (km/h)		80	60	50	40	60	50	40	30
Width (m)	Right of way	40				30 (40)			
	Lane	3.50				3.00 (3.25)			
	Shoulder	3.00		2.00		1.5 (2.0)		1.0 (1.5)	
	Median strip	N/A				N/A			
Min. horizontal curve (m)		215	115	80	50	115	80	50	30
Pavement slope (%)		2				2-5			
Shoulder slope (%)		3-6				3-6			
Type of pavement		Asphalt/cement concrete				Double bituminous treatment			
Max. super-elevation (%)		10				10			
Max. vertical grade (%)		4	5	6	7	4	5	6	7
Structure loading (minimum)		HS20-44				HS20-44			

Notes:

1. Figures in bracket are desirable values.
2. Minimum horizontal curve shall be determined in conjunction with super-elevation.
3. Terrain classification L: level, R: rolling, M: mountainous, S: steep



CLASS II (LEVEL TERRAIN)



CLASS III (LEVEL TERRAIN)
(Desirable width)

Typical Cross Sections