A FRAMEWORK FOR ASSET MANAGEMENT FOR PMGSY ROAD NETWORK

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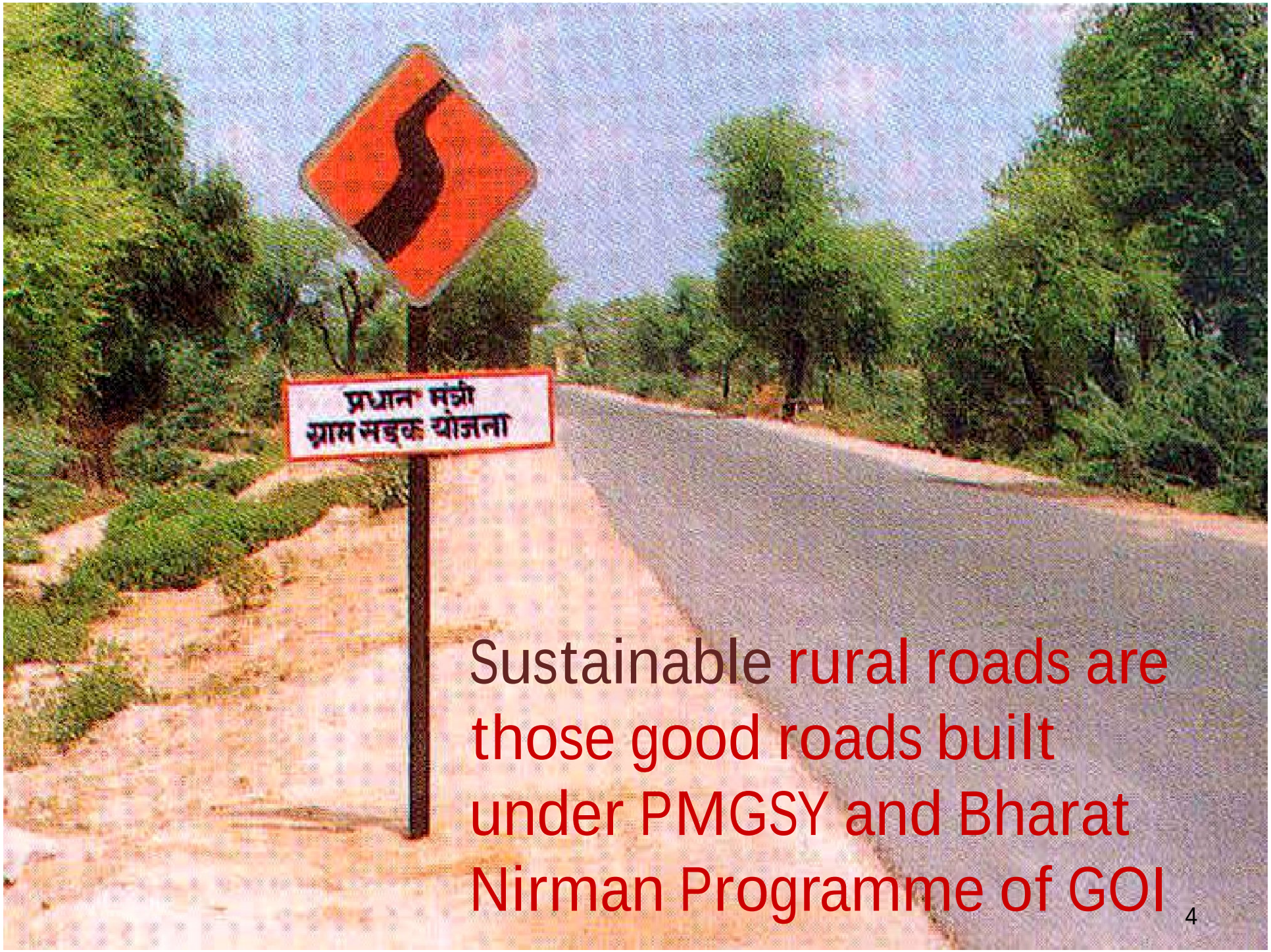
PMGSY ROADS

A Symbol for Quality and Sustainability for rural roads



Sustainable rural roads are those good roads built under PMGSY and Bharat Nirman Programme of GOI

PMGSY Road in West Bengal

PMGSY Road in Gujarat

Tamil Nadu

Gujarat

West Bengal

Himachal Pradesh

22 4 2003

Madhya Pradesh

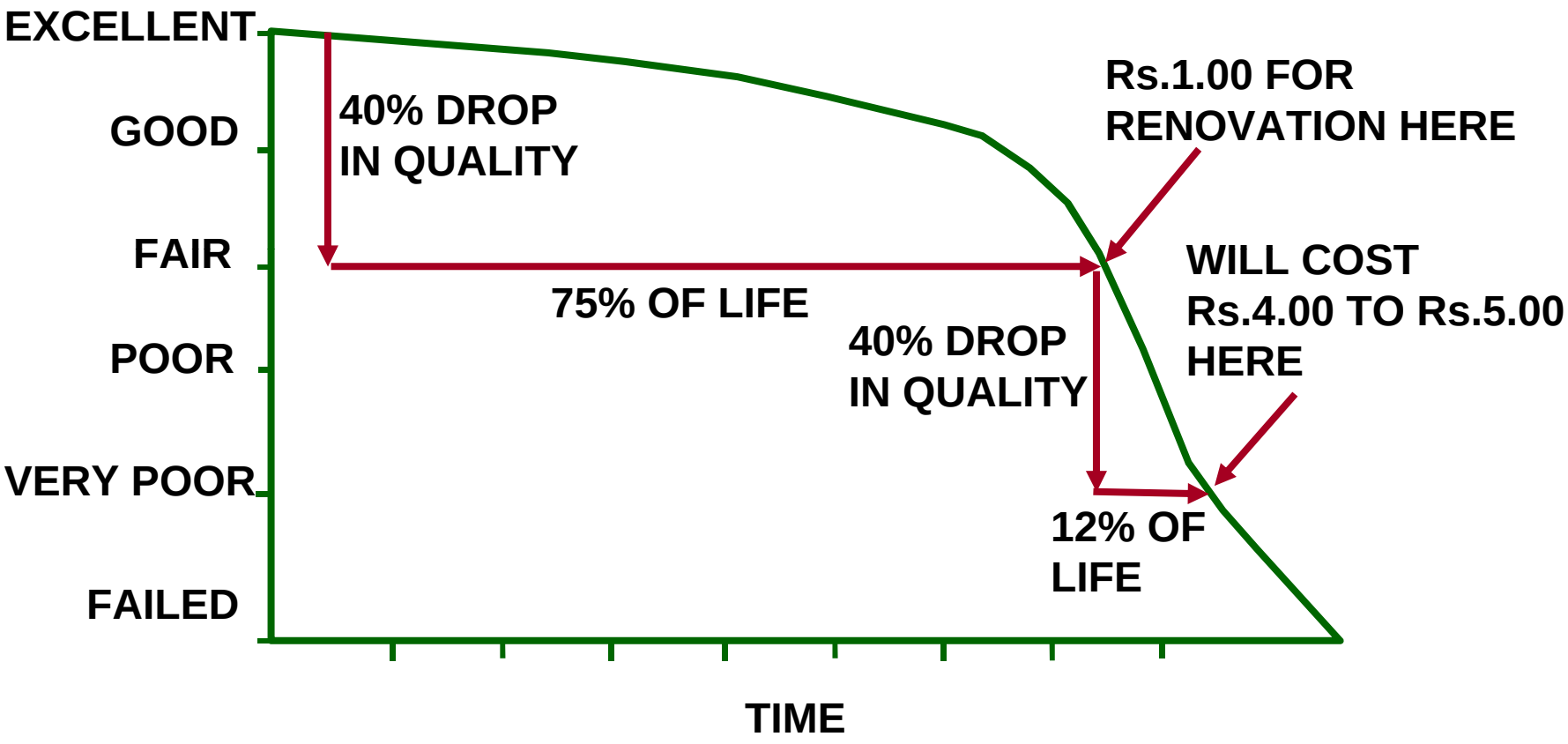

28 5 2003

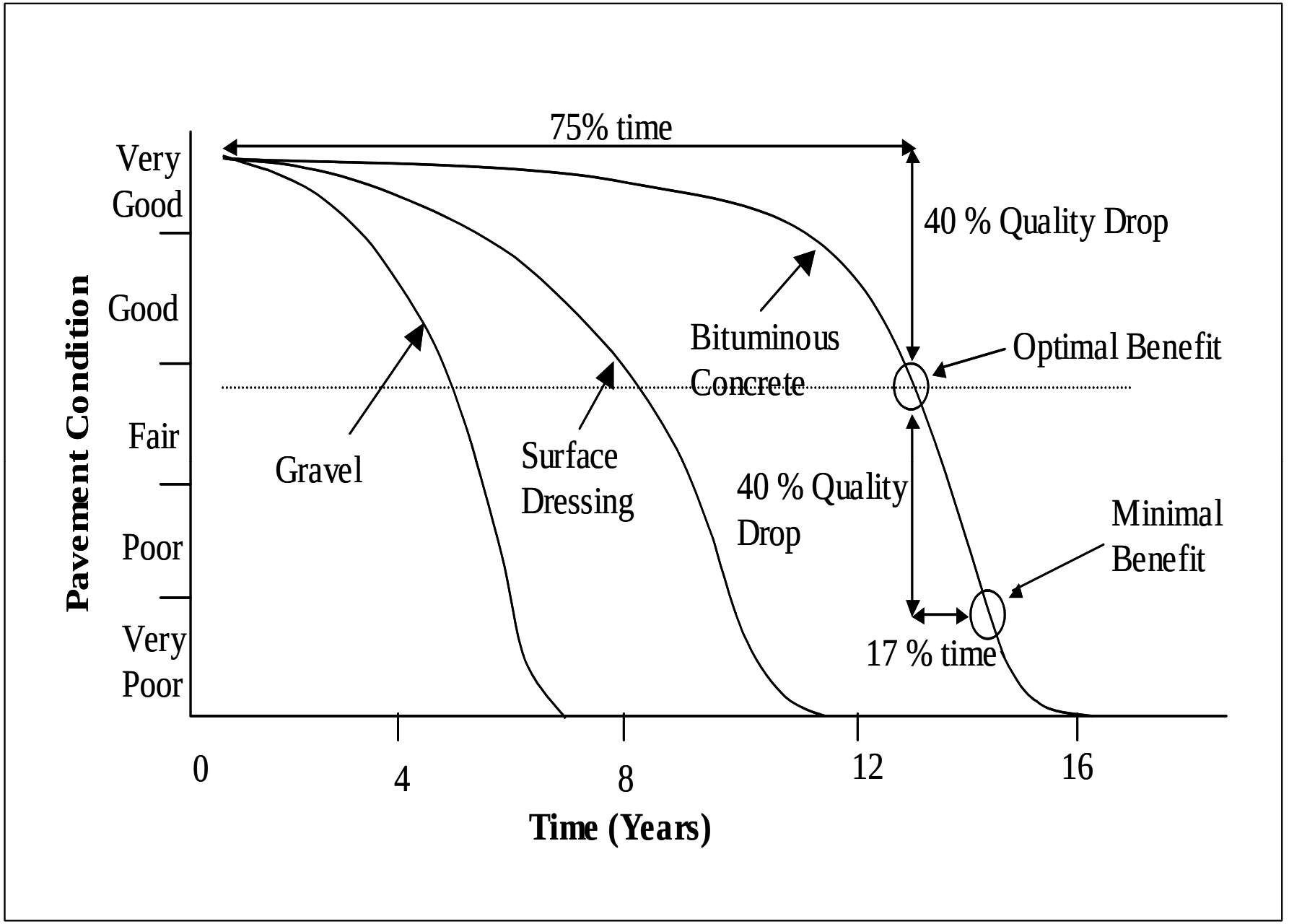

GOMATHA
PIAGGIO
STOP SOUND HORN
TN37
AF3969

Preservation of Road Assets

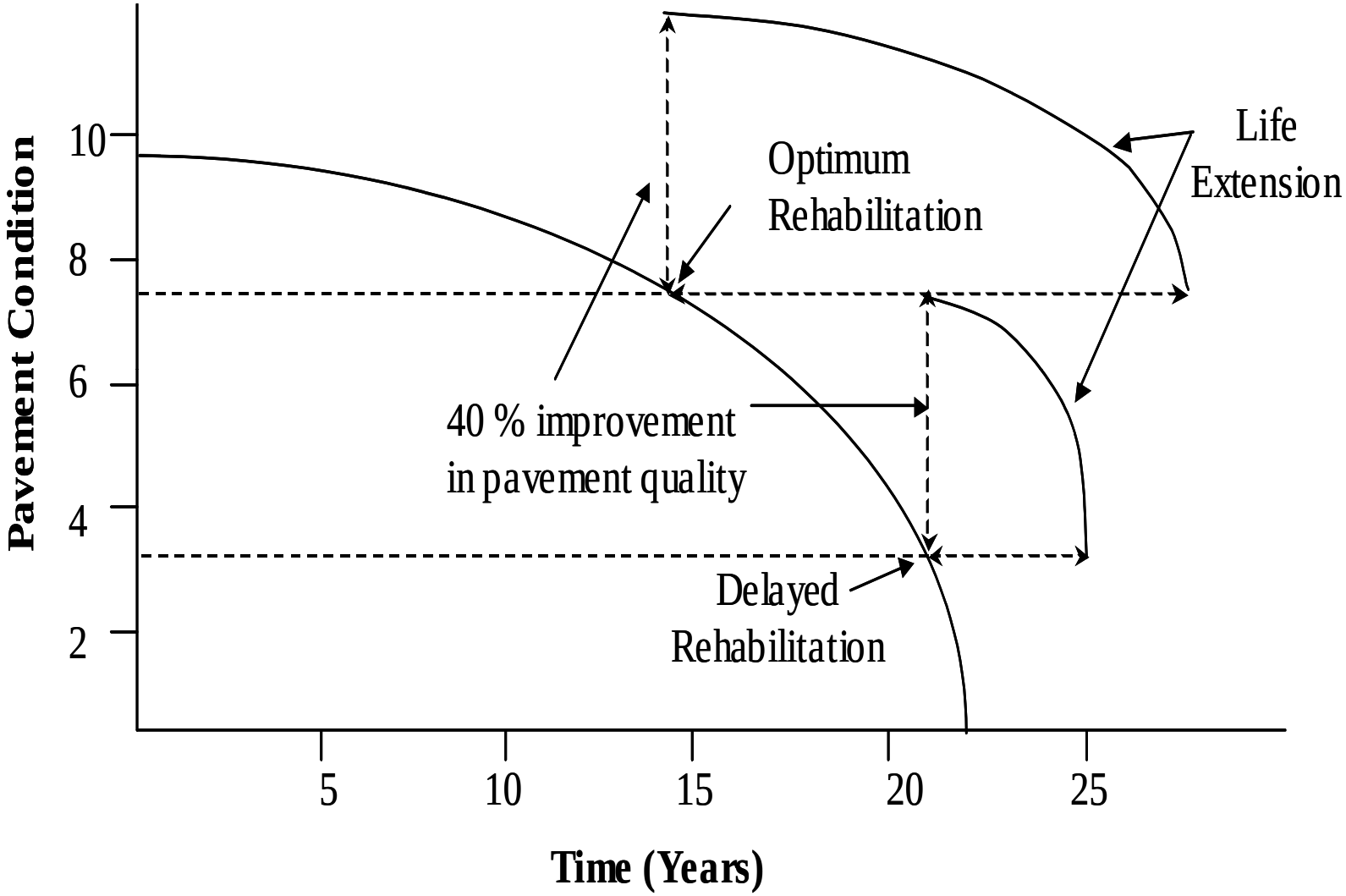
- Pavement deteriorates due to the combined effects of traffic, original strength of pavement, climate and other environmental factors
- Maintenance of shoulders, drainage facilities, road furniture apart from carriageway / pavement is also required
- Unsealed roads deteriorate faster and may need more frequent maintenance
- Road maintenance fund requirement and strategies depend on terrain, rainfall and traffic

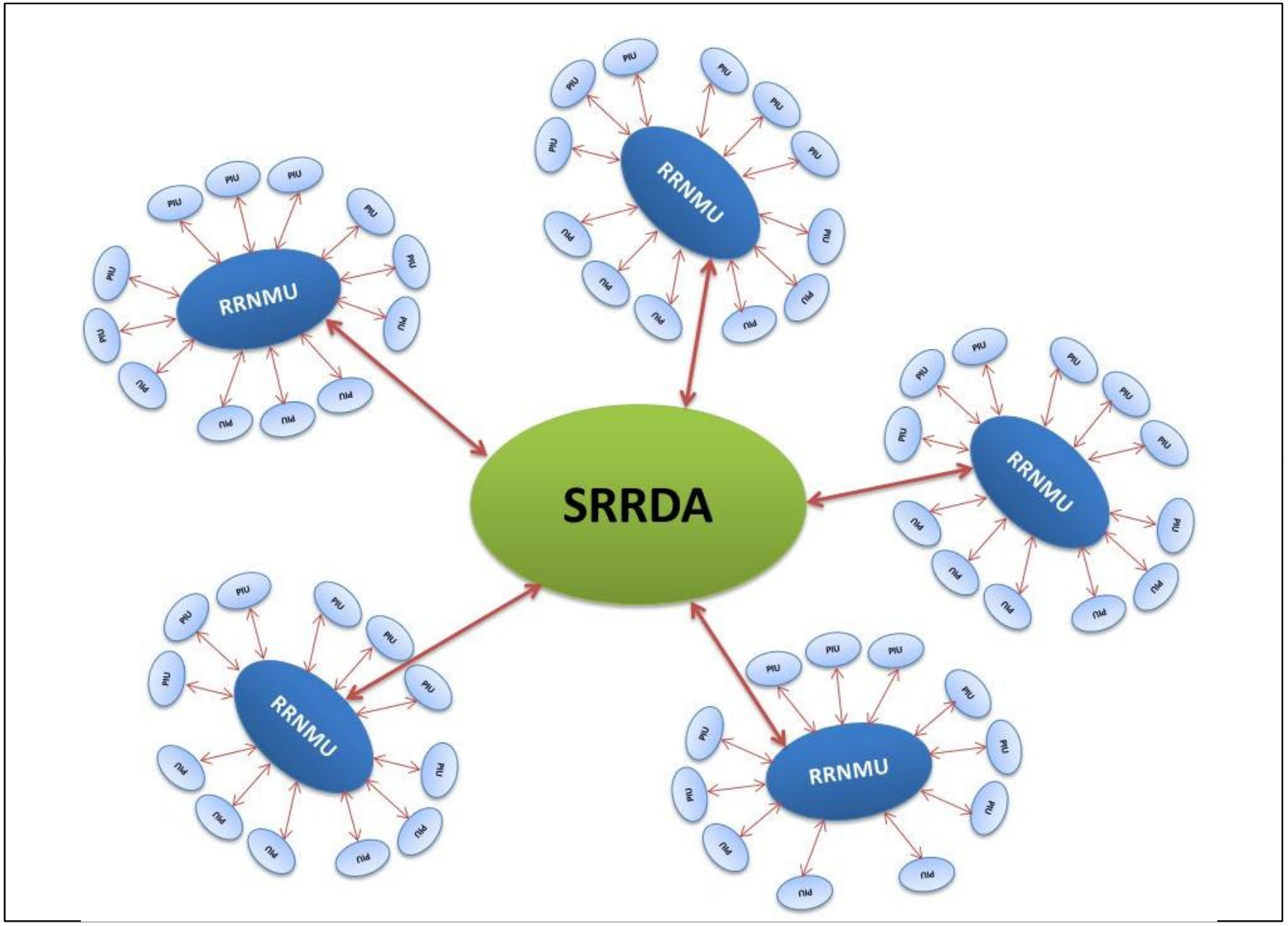
Timing of Maintenance




75% time
Very Good
Good
Fair
Poor
Very Poor
Pavement Condition
40 % Quality Drop
Bituminous Concrete
Optimal Benefit
Gravel
Surface Dressing
40 % Quality Drop
Minimal Benefit
17 % time
0
4
8
12
16
Time (Years)

A stitch in time saves nine…




SRRDA
RRNMU
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RRNMU
PIU

Condition Rating

Rating		1	2	3	4	5
Methodology		Very Poor	Poor	Fair	Good	Very Good
1	Through Visual Assessment	Road not accessible, pavement failed	Access is lost / at risk; Passage is dangerous	Major defects, but access not at risk	Minor defects	No defects
2	Riding comfort at 50 km/h	Very rough	Rough	Not com-fortable	Com-fortable	Smooth
3	Safe driving speed in km/h	Less than 10	10-20	20-30	30-40	More than 40
4	Road roughness in mm/km	>4000	3500-4000	3000-3500	2500-3000	<2500

Maintenance Planning & Budgeting

Criteria		Very Poor	Poor	Fair	Good	Very Good
1	Number of roads in group	15	14	22	15	34
2	Maintenance/ Improvement plans	Rehabilitation or reconstruction	Reseal after major patch re-construction	Heavy patching plus RM	Reseal followed by RM	Routine Main-tenance (RM)
3	Funds needed for upgrading, INR	20 Lakh/km	17 Lakh/km	15 Lakh/km	5 Lakh/km	1 Lakh/km
4	Proposed with reduced allocation	16 Lakh/km	13 Lakh/km	12 Lakh/km	4 Lakh/km	1 Lakh/km

Adjusted Number of Roads in Each Category for Maintenance

	Criteria	Very Poor	Poor	Fair	Good	Very Good
1	Number of roads in group (Original)	15	14	22	15	34
2	Adjusted number of roads	10	10	18	12	50
3	Maintenance/ Improvement plans	Rehabilitation or reconstruction	Reseal after major patch reconstruction	Heavy patching plus RM	Reseal followed by RM	Routine Main-tenance (RM)

Rating of 13 Parameters of Road in 1 to 5 Scale

Defect	Measure	Condition Rating				
		1	2	3	4	5
Potholes & depressions	% area	>1%	0.5% - 1%	0.1%-0.5%	<0.1%	Nil
Camber	Condition	Very Poor	Poor	Fair	Good	Very Good
Pavement cracking	% area	>30%	20% - 30%	10% - 20%	5% - 10%	<5%
Ravelling	% area	>30%	10% - 30%	5% - 10%	1% - 5%	<1%
Shoving	% area	>1%	0.5% - 1%	0.1 - 0.5%	<0.1%	Nil
Settlement & depressions	% area	>5%	3% - 5%	1% - 3%	<1%	Nil
Rutting	mm	>50	20 - 50	10 - 20	5 - 10	<5
Pavement edge break	% length	>50%	30% - 50%	20% - 30%	10% - 20%	<10%
Shoulder (grading, vegetation, trees, shrubs)	Condition	Very Poor	Poor	Fair	Good	Very Good
Rain cuts alongside slopes (LHS & RHS separately)	Condition	Very Poor	Poor	Fair	Good	Very Good
Side drains (LHS & RHS separately)	% silted	100%	75 - 100%	50 - 75%	25 - 50%	<25%
CDS- blocked, sedimented / eroded	% blocked	>75%	50 - 75%	25 - 50%	<25%	All open
Road furniture, signs	Condition	Very Poor or missing	Poor	Fair	Good	Very Good

RCI = (RCS x Terrain multiplier x Rainfall multiplier) + Add-on Factors for (Age + Traffic)

Factor	Criteria	Multiplier
Rainfall	Low: <500mm/year Medium: 500-1000mm/year High: 1000mm/year	1.25 1.15 1
Terrain	Mountainous & hill areas Plain & rolling terrain	1 1.25

Parameter	Condition	Factor		
Age of road pavement, since construction or last renewal	>5 years 4 - 5 years 3 - 4 years 2 - 3 years 1 - 2 years	1 5 15 25 30		
Traffic volume (commercial vehicles per day)		**Through road**	**Major link**	**Link**
	0 - 50	5	10	20
	51 - 150	4	8	15
	151 - 300	2	6	10
	>300	1	2	5

Range of RCI Values for Prioritization

RCI (overall projected condition/serviceability of rural road) = (RCSxRaifallxTerrain Multipliers) + Age factor score + Traffic volume score

RCS		Age factor score		Traffic volume score		Total (Overall RCI)	
Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
10	50	1	30	1	20	12	100

Indicative Range of RCIs for Different Road Condition Rating

Road condition	Condition Rating				
	1	2	3	4	5
	Very Poor	Poor	Fair	Good	Very Good
RCI range	<40	40-60	60-75	75-90	>90

Sl. No.	RCS	RCI	Priority
70	22.91	43.64	1
68	20.18	45.23	2
58	21.15	46.44	3
69	21.24	46.55	4
28	30.57	49.21	5
56	31.10	49.88	6
30	28.00	51.00	7
37	29.17	51.21	8
73	32.25	51.31	9
32	29.18	52.48	10
36	29.40	52.75	11
75	30.36	52.95	12
3	26.42	53.03	13
29	31.35	55.19	14
31	32.15	56.19	15
34	33.64	58.05	16
35	35.25	60.06	17
76	24.08	60.10	18
33	35.42	60.28	19
74	24.27	60.34	20
67	32.40	60.50	21
66	25.32	61.65	22
54	34.00	62.50	23
2	35.77	64.71	24
1	32.62	67.78	25
9	33.84	69.30	26
20	23.69	69.61	27
53	23.69	69.61	28
41	31.94	69.93	29
38	42.25	70.00	30

Sl. No.	RCS	RCI	Priority
63	24.02	70.03	31
43	25.40	71.75	32
18	33.65	72.06	33
49	28.20	72.53	34
19	26.28	72.85	35
42	34.30	72.88	36
55	26.73	73.41	37
64	27.17	73.96	38
14	27.50	74.38	39
59	23.90	74.88	40
45	28.00	75.00	41
46	28.00	75.00	42
22	36.50	75.63	43
21	24.51	75.64	44
23	24.65	75.81	45
44	36.67	75.84	46
77	25.12	76.40	47
7	29.15	76.44	48
79	25.39	76.74	49
78	30.06	77.58	50
60	26.24	77.80	51
40	30.33	77.91	52
15	27.78	79.73	53
61	27.18	79.76	54
39	28.00	80.00	55
52	28.33	80.14	56
11	32.59	80.74	57
47	28.76	80.95	58
65	32.80	81.00	59
16	33.18	81.48	60
57	33.25	81.56	61

Sl. No.	RCS	RCI	Priority
10	29.48	81.85	62
50	33.50	81.88	63
62	33.63	82.04	64
4	30.15	82.69	65
25	30.35	82.94	66
17	34.48	83.10	67
13	31.32	84.15	68
6	36.60	84.50	69
24	31.70	84.63	70
5	36.96	84.95	71
72	32.09	85.11	72
71	33.84	87.05	73
28	44.93	90.02	74
27	46.74	90.06	75
48	40.13	90.08	76
51	42.44	90.12	77
12	36.99	91.24	78
8	37.20	91.50	79

Legend:

Rating	RCI
Very Good	> 90
Good	75-90
Fair	60-75
Poor	40-60
Very Poor	< 40
Resurfacing done	
Resurfacing proposed	
Resurfacing kept pending	
Unmatched	

Conclusions

- The asset of all-weather rural roads built in India over last 15 years under the PMGSY is worth more than USD 80 billion (Approx. INR 525,000 crores).
- The road authorities of the States cannot afford to allow undue deterioration of the asset value of the rural road network
- A simple but scientifically valid asset management planning and prioritization methodology based on actual observed road condition data has been developed
- It is a systematic prioritization and budgeting procedure free from any bias or ad-hocism for maintenance management of rural road network with strong asset management principles

Thank You