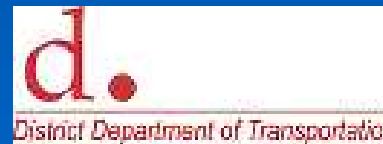


DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION

PAVEMENT NETWORK EVALUATION



ROADWAY NETWORK

TOTAL ROADWAY NETWORK: 4,346 lane miles

LOCAL: 2,292 lane miles

FEDERAL: 2,054 lane miles

Roadway Network is one of the biggest asset for the City

PAVEMENT MANAGEMENT

- Pavement Condition Data is collected by a consultant using state-of-the-art imaging technology to collect continuous images of over 4300 lane miles of pavement surface
- Data collection is completed annually on some part of the network, if not the entire network
- Data reduction performed to determine Pavement Condition Index (PCI)



VIDEO VAN EQUIPPED WITH STATE-OF-THE-ART IMAGING TECHNOLOGY

ROADWAY NETWORK

LOCAL / FEDERAL ROADWAY CONDITION

CONDITION / PCI RANGE	LOCAL		FEDERAL	
	LANES MILES	% NETWORK	LANES MILES	% NETWORK
EXCELLENT 100 – 86	632.1	27.6%	845	41.1%
GOOD 85 – 71	618	27.0%	786.8	38.3%
FAIR 70 – 56	439.8	19.2%	294.6	14.3%
POOR 55 – 36	380.4	16.6%	109.5	5.3%
VERY POOR 35 – 21	144.3	6.3%	15.8	0.7%
FAILED 20 - 0	77.81	3.4%	2.1	0.1%

ROADWAY NETWORK ANALYSIS

REMAINING SERVICE LIFE CONCEPT (RSL)

Local Network = 2,292 lane miles

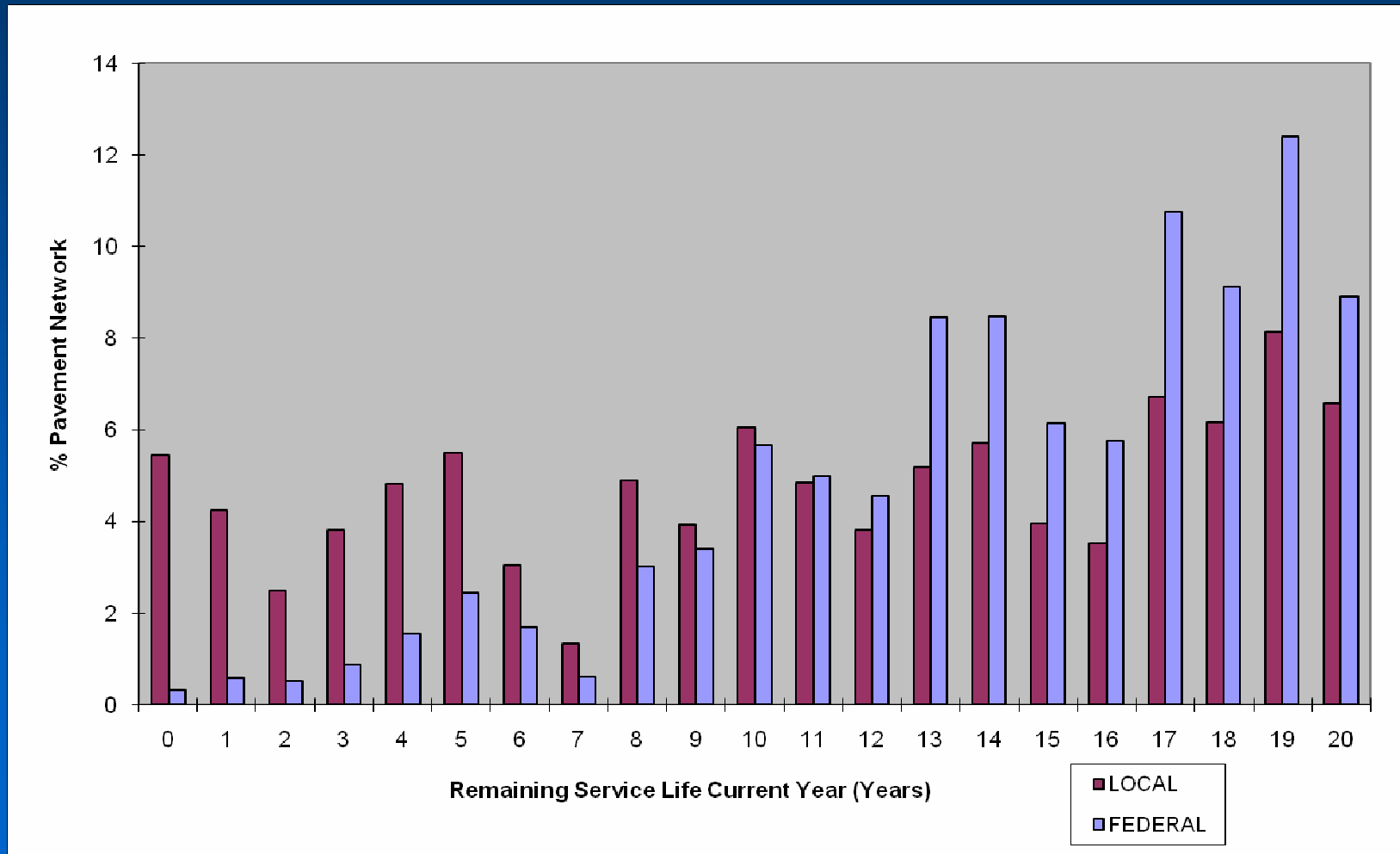
EACH YEAR, the local network **WILL LOOSE***

2,292 lane-mile-years

* If no improvement are made for 1 year, the number of years remaining in the life of each road segment will decrease by 1 year. Every year, the system ages by 1 year.

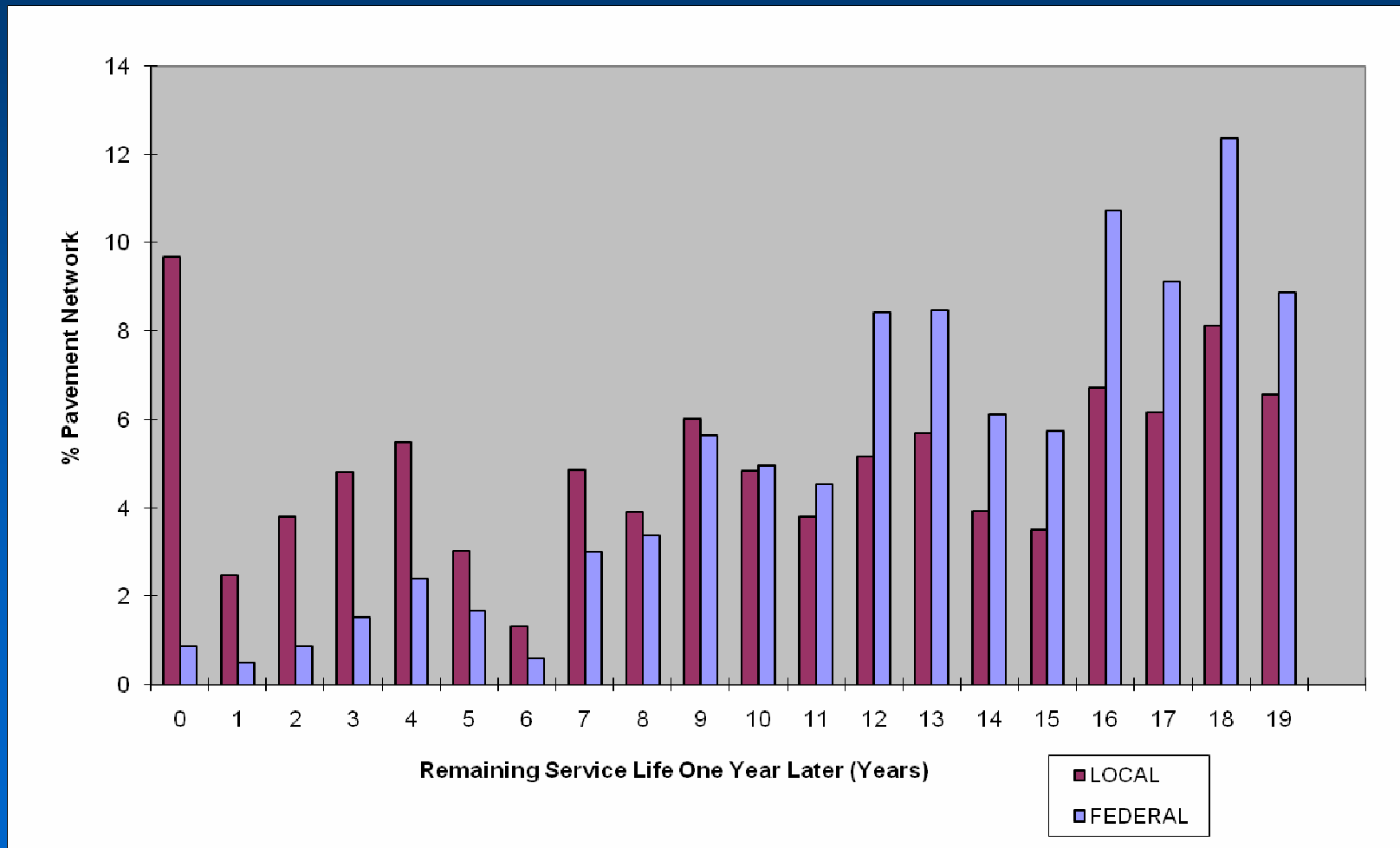
REMAINING SERVICE LIFE - RSL

RSL – Current Condition (in Years)



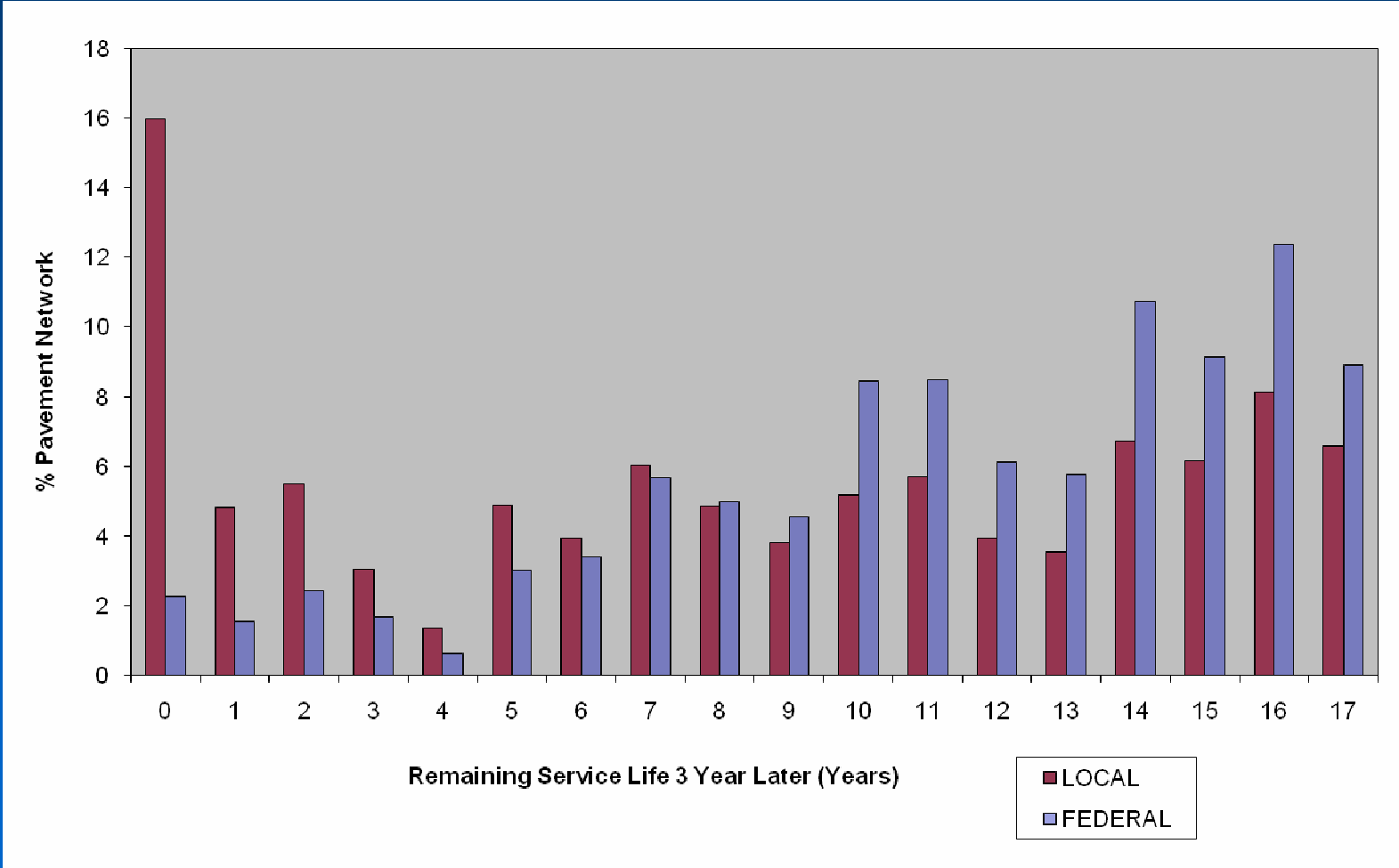
REMAINING SERVICE LIFE - RSL

RSL – One Year Later: the entire network aged 1 year



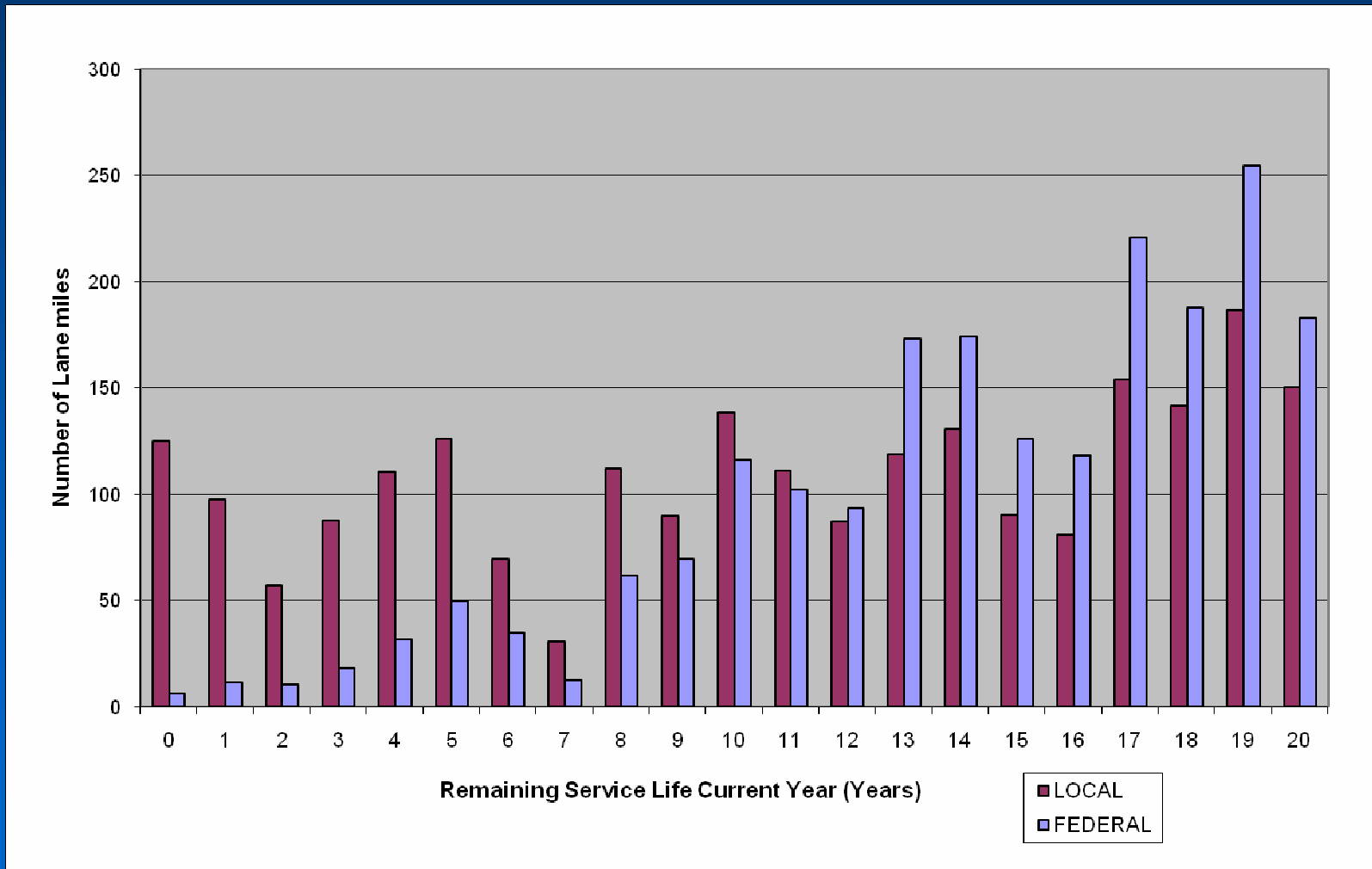
REMAINING SERVICE LIFE - RSL

RSL – 3 Years Later (in Years)



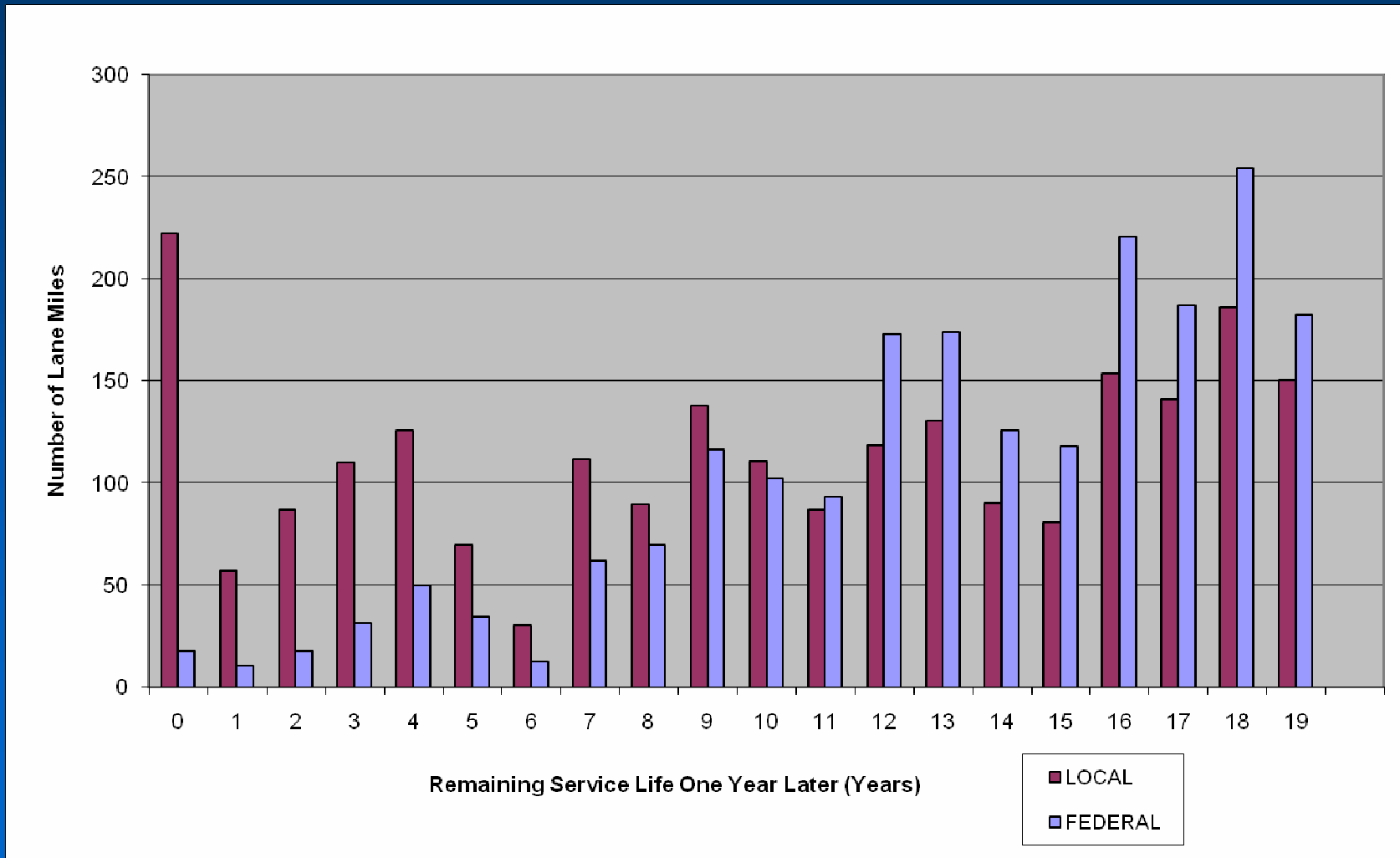
REMAINING SERVICE LIFE - RSL

RSL – Current Condition (in number of Lane Miles)



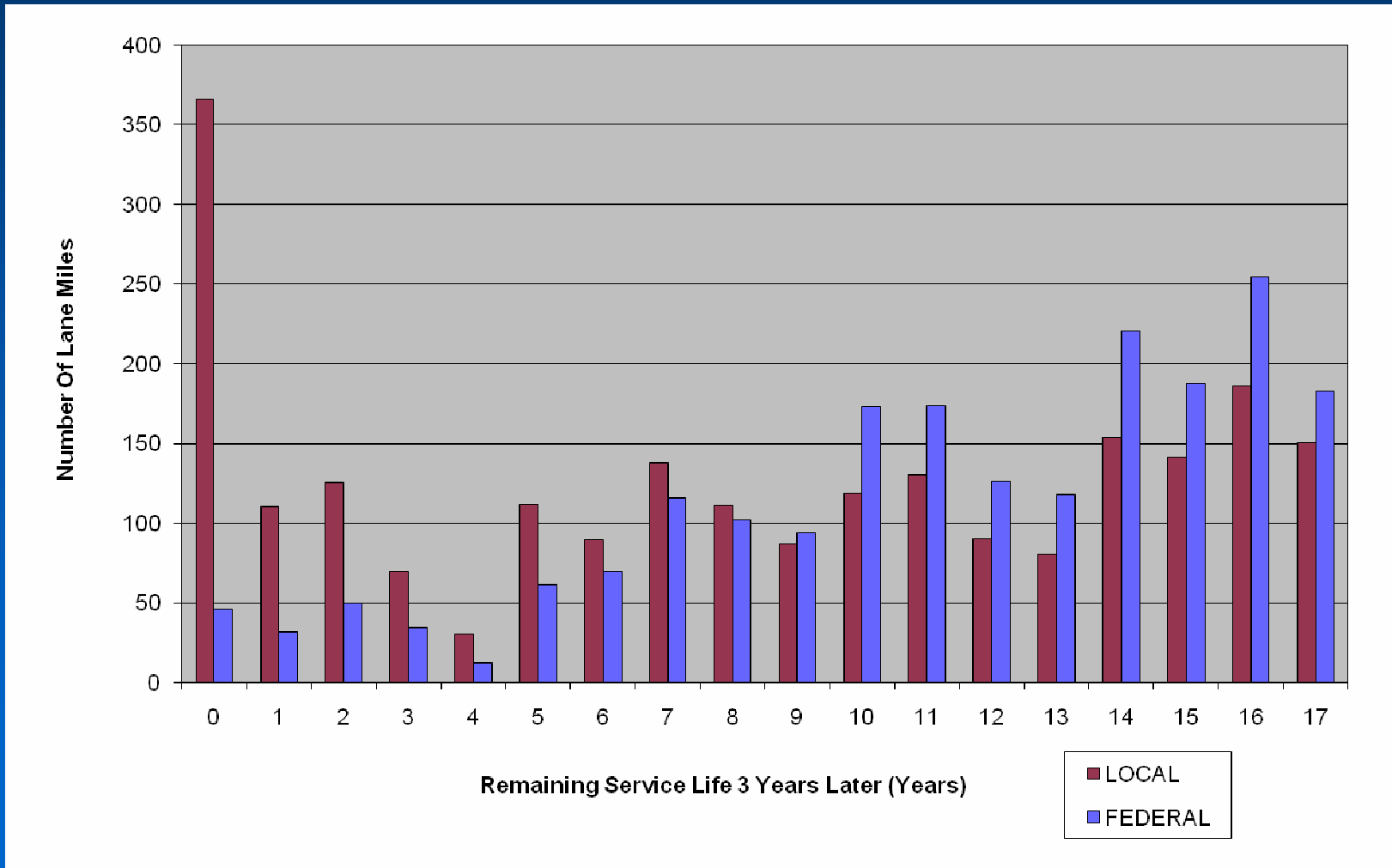
REMAINING SERVICE LIFE - RSL

RSL – One Year Later (in number of Lane Miles)



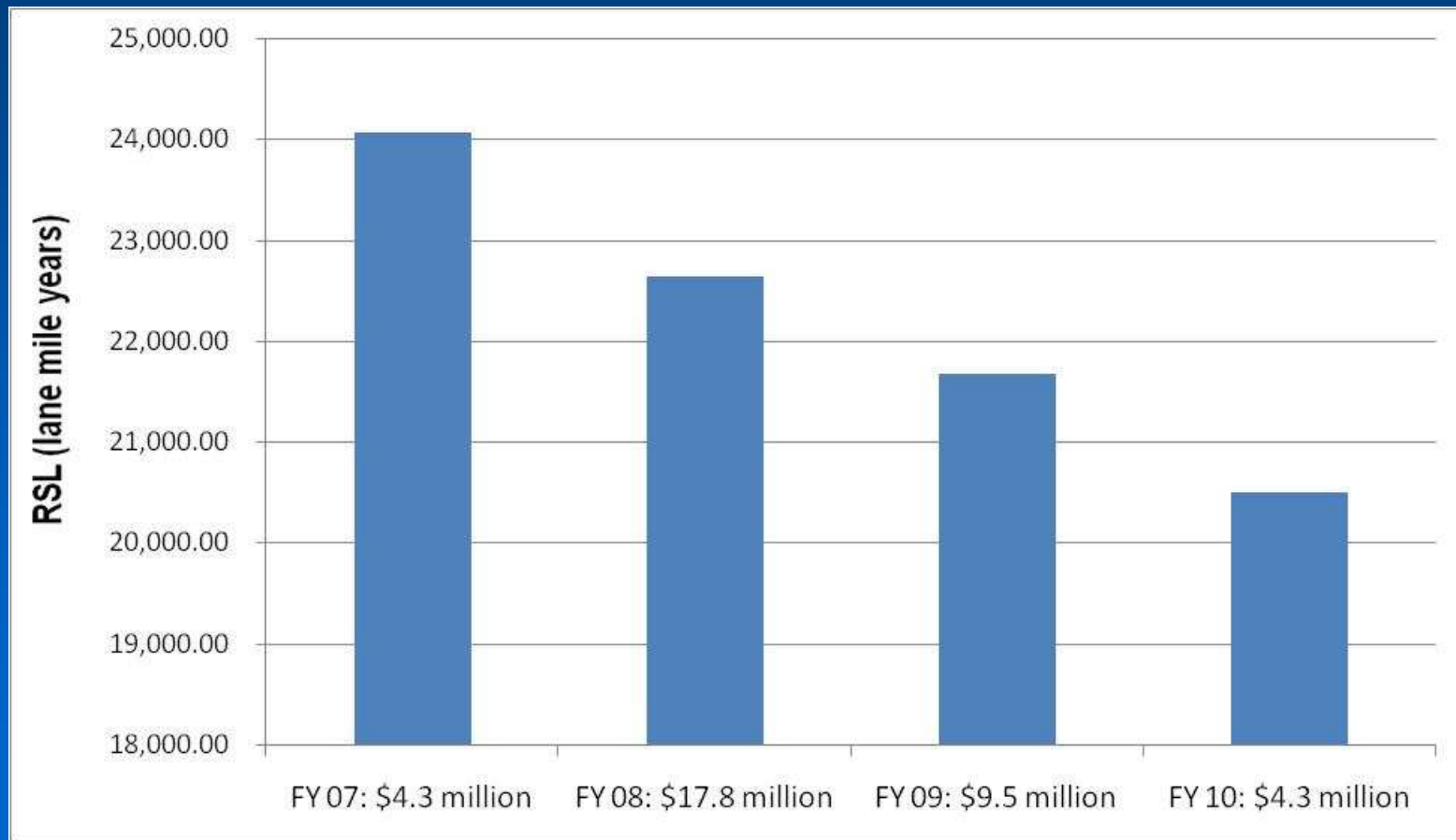
REMAINING SERVICE LIFE - RSL

RSL – 3 Years Later (in number of Lane Miles)



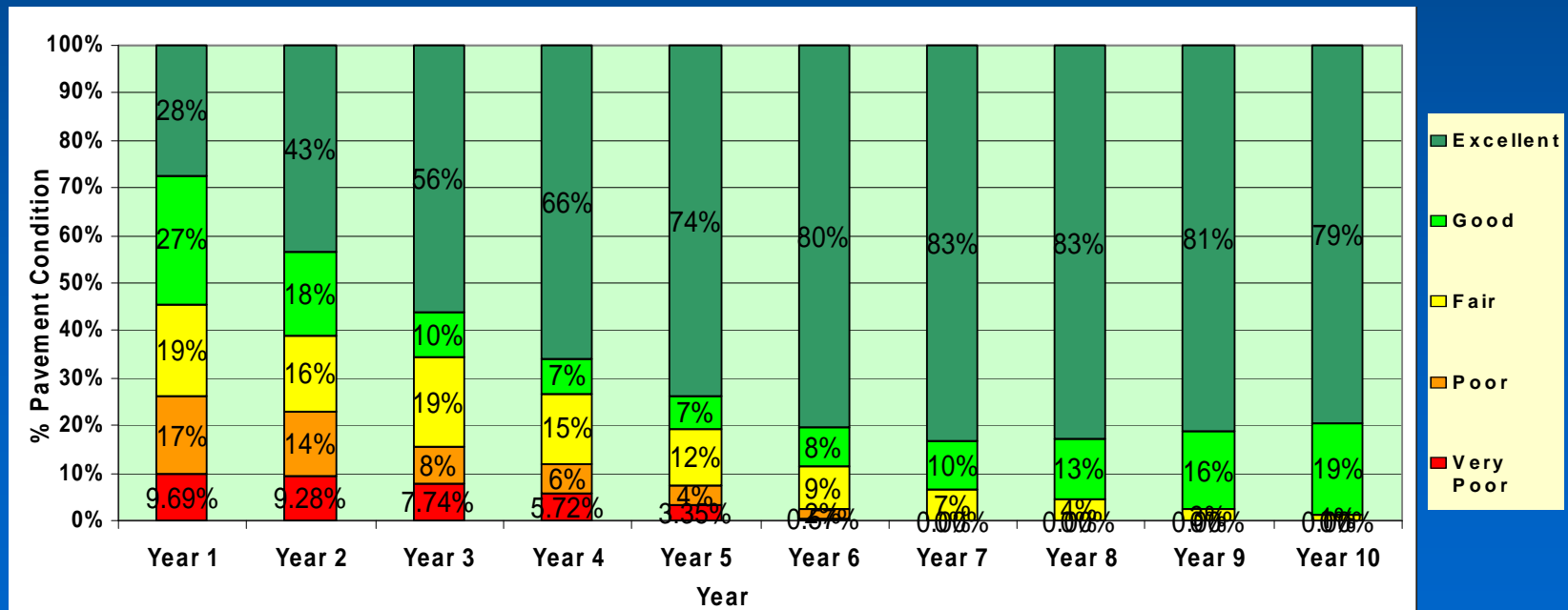
REMAINING SERVICE LIFE – FY07 – FY10

LOCAL NETWORK REMAINING SERVICE LIFE (RSL) OVER 4 YEAR PERIOD: From FY07 to FY10



PROGRAM ANALYSIS

- 10% OF LOCAL NETWORK IS IN VERY POOR CONDITION REQUIRING MAJOR UPGRADE TO COST ABOUT **\$214 MILLION**
- \$50 MILLION/YEAR SPENT ON PAVEMENT UPGRADE YIELDS:

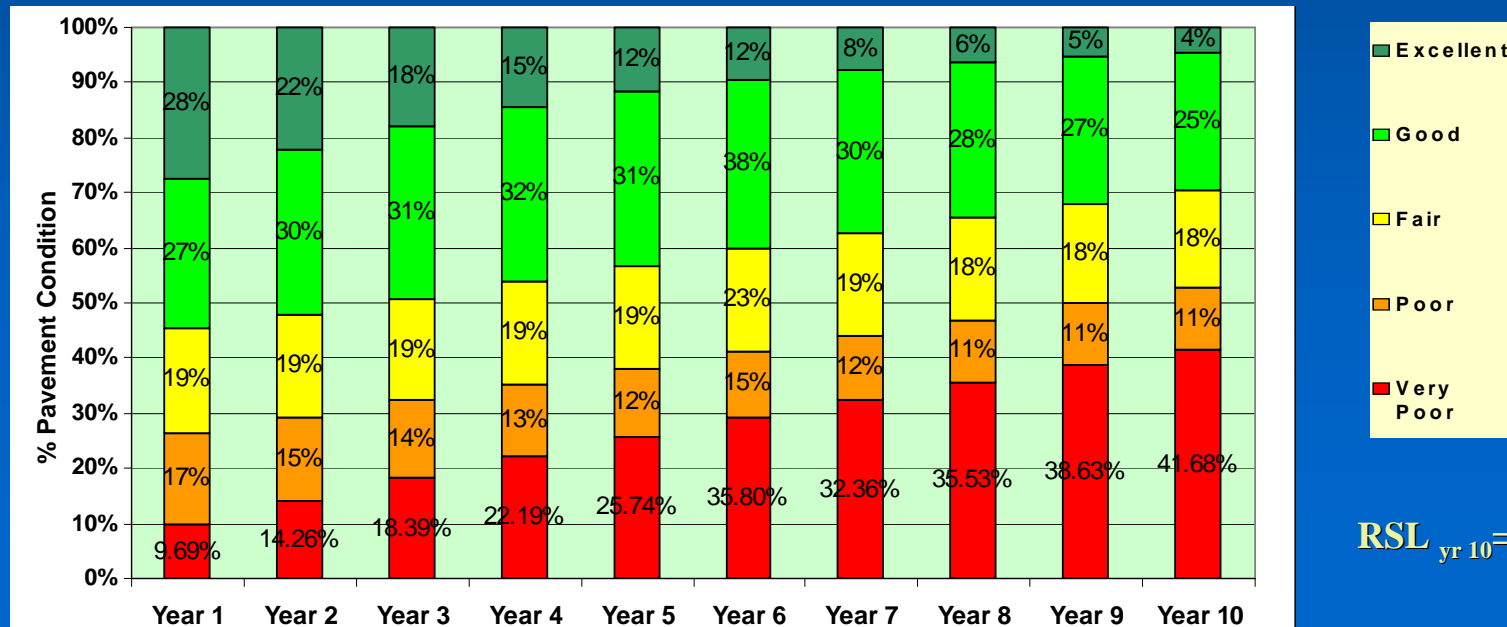


PROGRAM ANALYSIS

* \$4.3 million budget
 * 100% WORST FIRST

MAINTENANCE TYPE (100% WORST FIRST)	% WORK	LANE MILES	DESIGN LIFE	LANE MILE YEARS ADDED
reconstruction	20%	0.75	20	15
mill & overlay	75 %	9.7	7	68
Patching and pothole repair	5 %	1.5	3	4.5
TOTAL COVERED	100%	12		87.5

DEFICIT = TOTAL LANE MILES YEARS – LANE MILE YEARS ADDED = 2,292 – 87.5 = 2,204.5



RSL_{yr 10} = 13,429

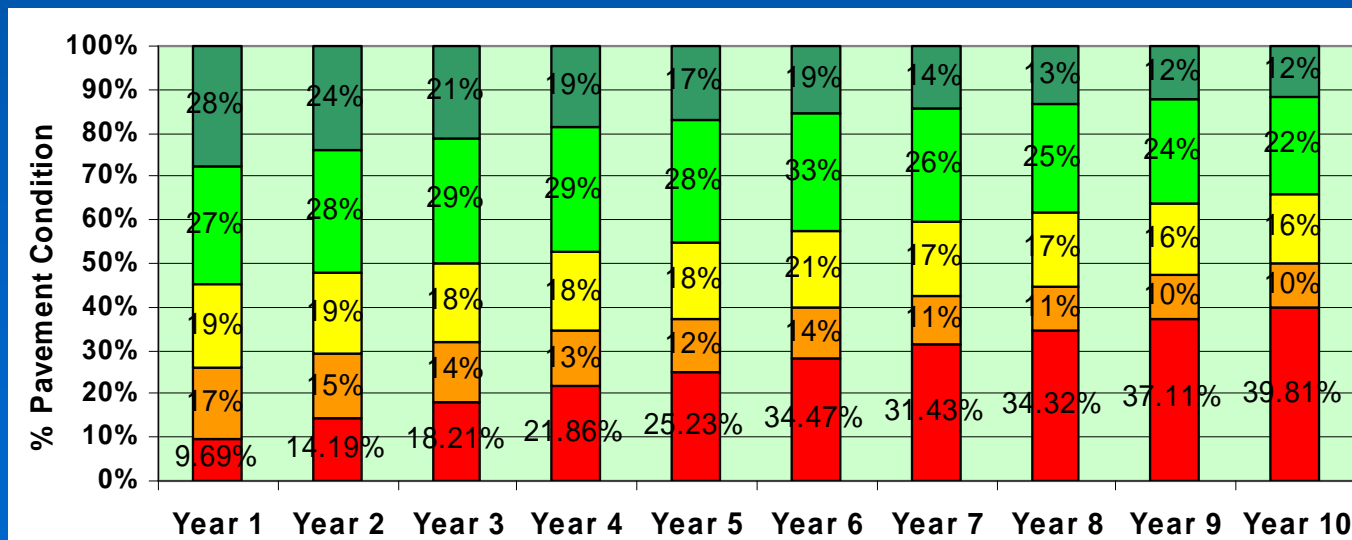


PROGRAM ANALYSIS

* \$4.3 million budget
 * 75% WORST, 25% PRESERVATION

MAINTENANCE TYPE (75% WORST, 25% PRESERVATION)	% WORK	LANE MILES	DESIGN LIFE	LANE MILE YEARS ADDED
reconstruction	20%	0.75	20	15
mill & overlay	50%	6.25	10	62.5
patching and pothole repair	5%	1.4	3	4.2
thin overlay - PRESERVATION	10%	1.8	8	14.4
crack sealing - PRESERVATION	10%	28.21	3	85
chip seal/slurry seal - PRESERVATION	5%	1.41	8	11.2
TOTAL COVERED	100%	40		192.3

DEFICIT = TOTAL LANE MILES YEARS – LANE MILE YEARS ADDED = 2,292 - 192 = 2,100



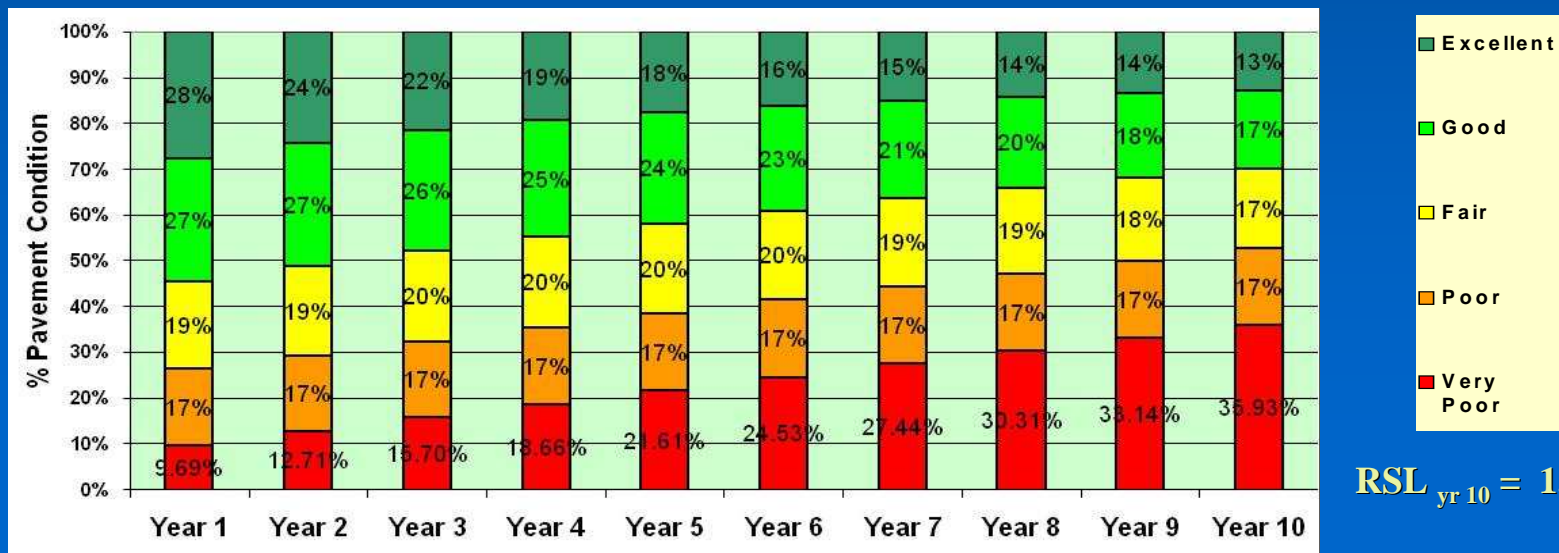
RSL_{yr 10} = 14,730



PROGRAM ANALYSIS

- * \$4.3 million budget
- * 50% WORST, 50% PRESERVATION

MAINTENANCE TYPE (50% WORST, 50% PRESERVATION)	% WORK	LANE MILES	DESIGN LIFE	LANE MILE YEARS ADDED
reconstruction	25%	0.95	20	19
mill & overlay	20%	2.5	15	37.5
patching and pothole repair	5%	1.4	3	4.2
thin overlay - PRESERVATION	15%	2.82	8	22.5
crack sealing - PRESERVATION	20%	56	5	280
chip seal/slurry seal - PRESERVATION	15%	4.23	8	34
TOTAL COVERED	100%	68		397.2
DEFICIT = TOTAL LANE MILES YEARS – LANES MILES YEARS ADDED = 2,292 – 397.2 = 1,894.8				



RSL_{yr 10} = 15,995

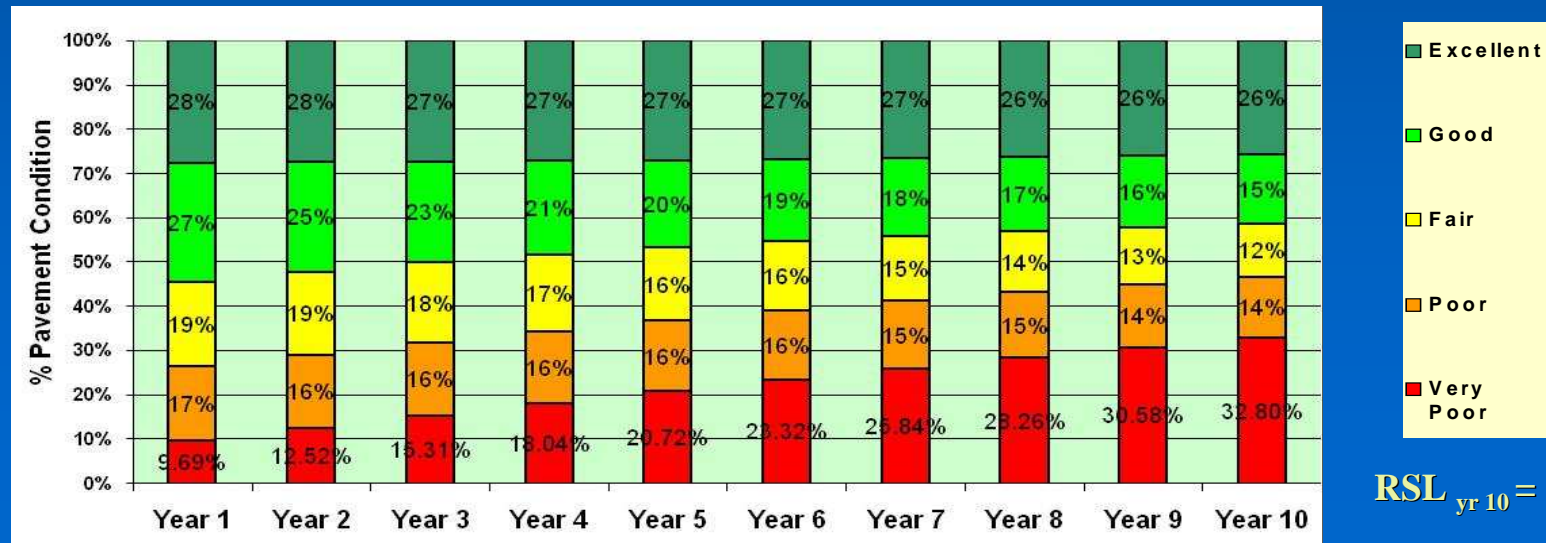


PROGRAM ANALYSIS

* \$10 million budget

* 50% WORST, 50% PRESERVATION

MAINTENANCE TYPE (50% WORST, 50% PRESERVATION)	% WORK	LANE MILES	DESIGN LIFE	LANE MILE YEARS ADDED
reconstruction	25%	2.19	20	43.8
mill & overlay	20%	5.8	10	58
patching and pothole repair	5%	3.2	3	9.6
thin overlay - PRESERVATION	15%	6.5	8	52
crack sealing - PRESERVATION	20%	131	5	655
chip seal/slurry seal - PRESERVATION	15%	9.8	8	78
TOTAL COVERED	100%	163		896
DEFICIT = TOTAL LANE MILES YEARS – LANES MILES YEARS ADDED = 2,292 – 896 = 1,395				



RSL_{yr 10} = 20,689

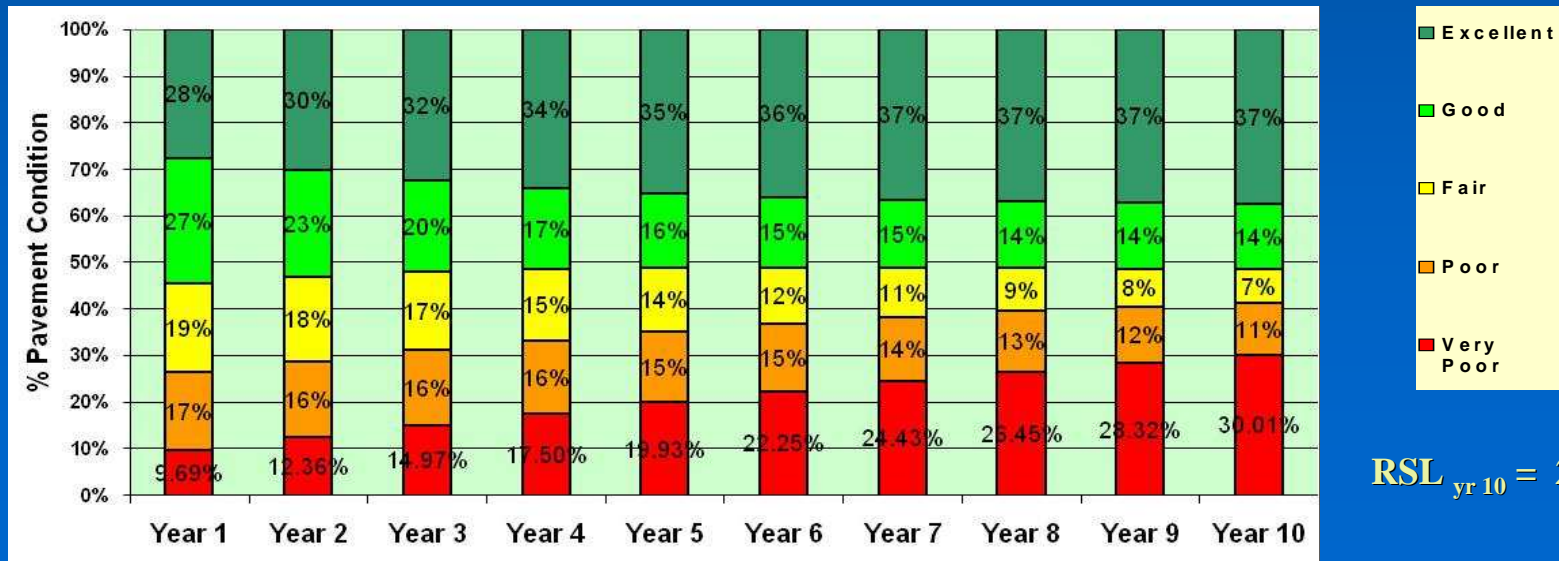


PROGRAM ANALYSIS

* \$15 million budget

* 50% WORST, 50% PRESERVATION

MAINTENANCE TYPE (50% WORST, 50% PRESERVATION)	% WORK	LANE MILES	DESIGN LIFE	LANE MILE YEARS ADDED
reconstruction	25%	3.28	20	66
mill & overlay	20%	8.75	10	87.5
patching and pothole repair	5%	5	3	15
thin overlay - PRESERVATION	15%	9.8	10	98
crack sealing - PRESERVATION	20%	196	3	980
chip seal/slurry seal - PRESERVATION	15%	14.76	5	73
TOTAL COVERED	100%	245		1,319.5
DEFICIT = TOTAL LANE MILES YEARS – LANES MILES YEARS ADDED = 2,292 – 1,319.5 = 972.5				



RSL_{yr 10} = 24,807



PROGRAM ANALYSIS

- * TO MEET MINIMAL NEED
- * 50% WORST, 50% PRESERVATION

MAINTENANCE TYPE <small>(50% WORST, 50% PRESERVATION)</small>	% WORK	LANE MILES	DESIGN LIFE	LANE MILE YEARS ADDED
reconstruction	30%	8	20	160
mill & overlay	15%	19	10	190
patching and pothole repair	5%	9	3	27
thin overlay - PRESERVATION	15%	20	8	160
crack sealing - PRESERVATION	20%	303	5	1515
chip seal/slurry seal - PRESERVATION	15%	30	8	240
TOTAL COVERED	100%	386		2,292
DEFICIT = TOTAL LANE MILES YEARS – LANES MILES YEARS ADDED = 2,292 – 2292 = 0 MEETS MINIMAL NEED				

$$RSL_{yr 10} = 33,327$$

YEARLY BUDGET REQUIRED TO MEET MINIMAL NEED =
\$30,820,000

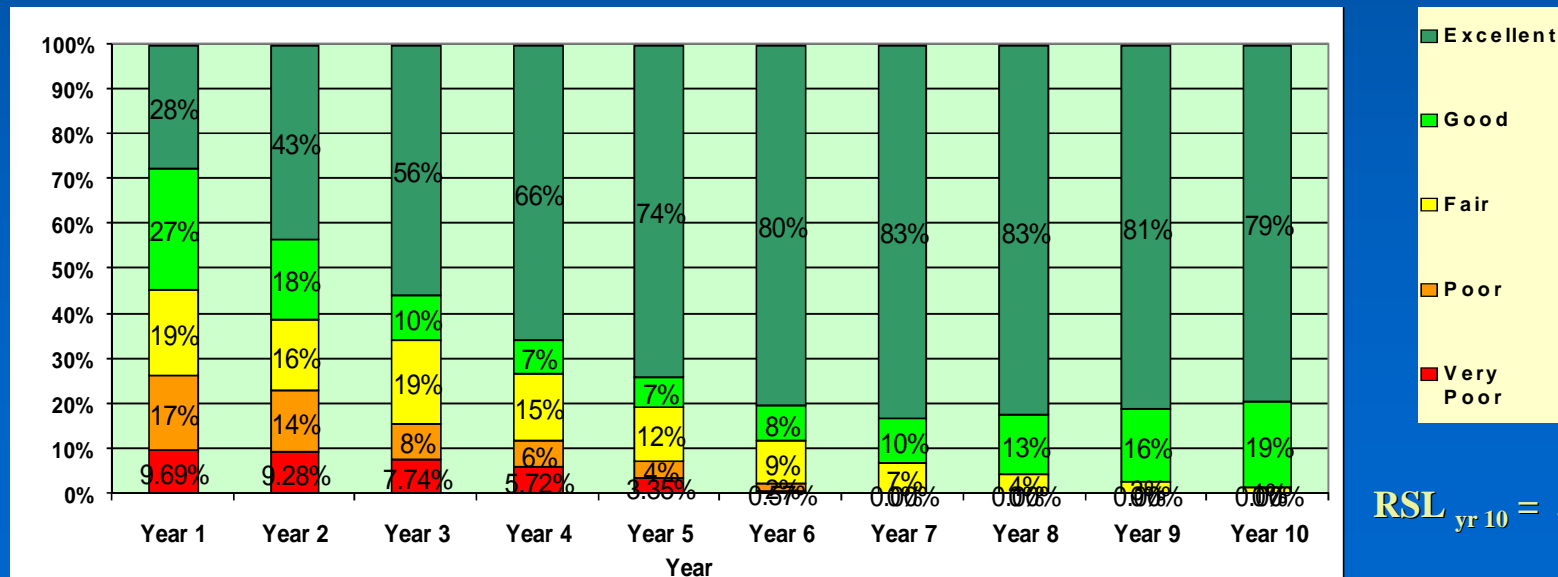
PROGRAM ANALYSIS

* \$50 million budget

* 75% WORST, 25% PRESERVATION

MAINTENANCE TYPE (75% WORST, 25% PRESERVATION)	% WORK	LANE MILES	DESIGN LIFE	LANE MILE YEARS ADDED
reconstruction	30%	20	20	400
mill & overlay	45%	98.5	15	1,477.5
patching and pothole repair	5%	24	2	48
thin overlay - PRESERVATION	5%	16.5	10	165
crack sealing - PRESERVATION	10%	492	3	1476
chip seal/slurry seal - PRESERVATION	5%	24.5	5	122.5
TOTAL COVERED	100%	676		3,688.5

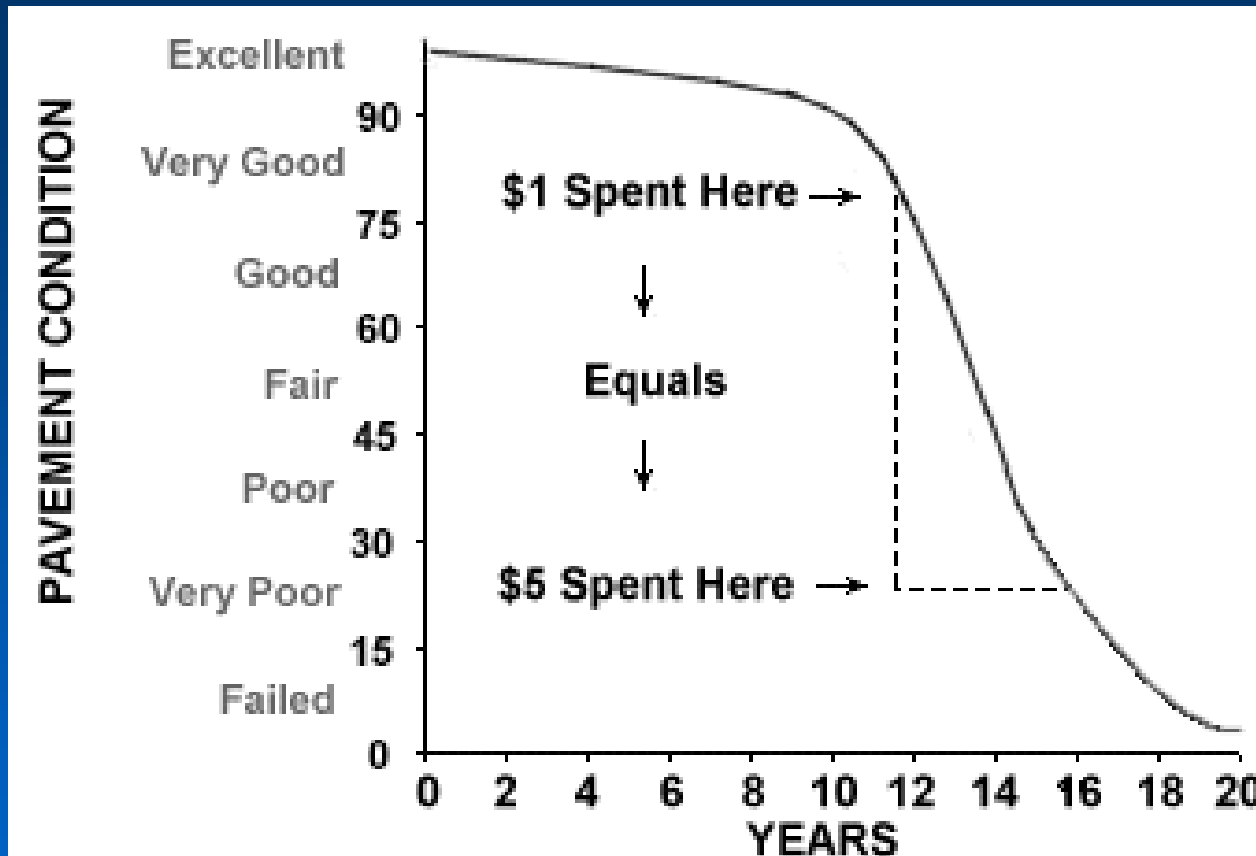
3,688.5 – 2,292 = 1,396.5 LANE MILE YEARS ADDED, NO DEFICIT



RSL_{yr 10} = 38,780



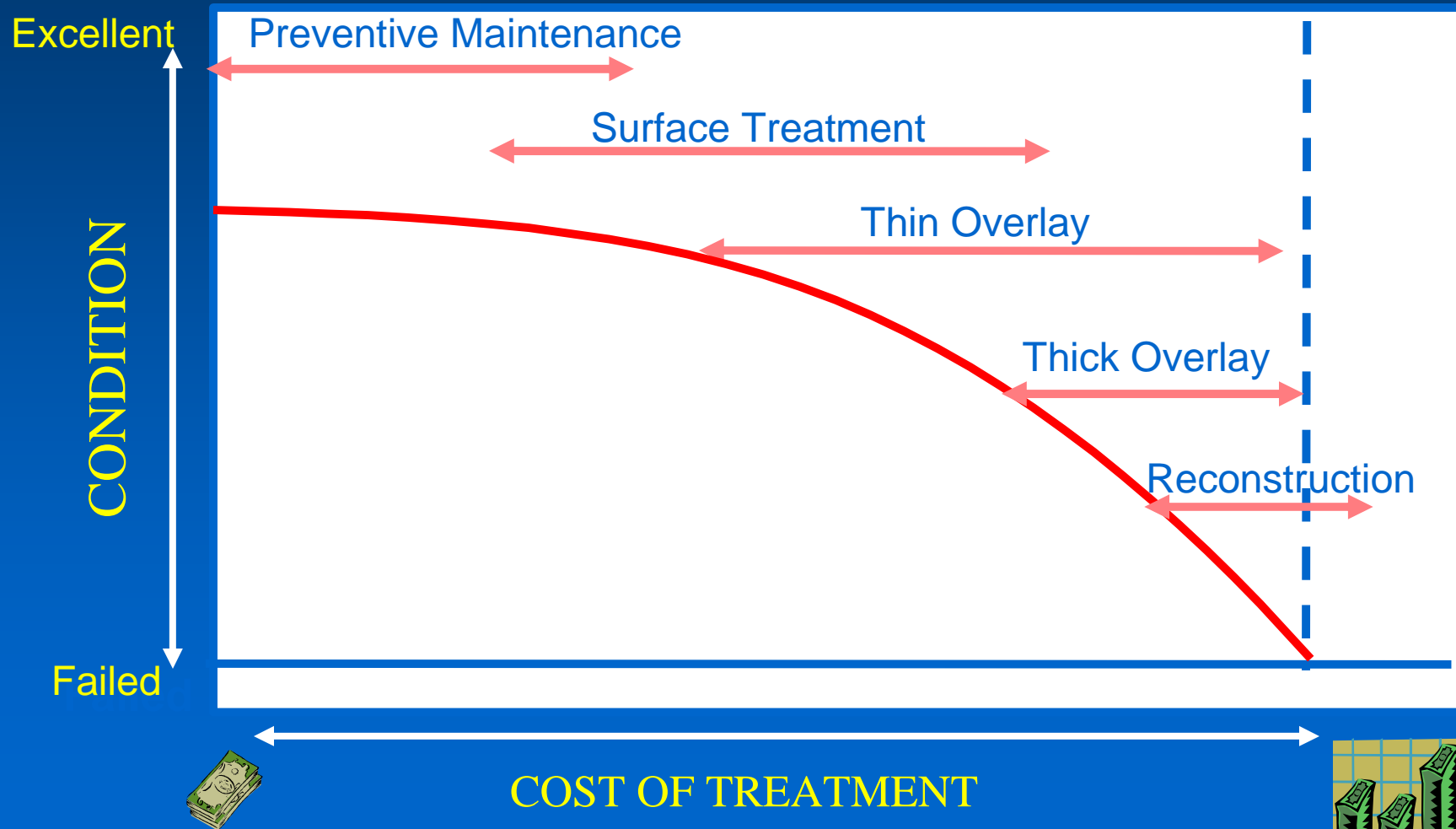
PAVEMENT LIFE CYCLE



Simple Example: Changing your automobile's oil regularly for \$19.99 helps prevent damage that will cost in thousands \$\$ to repair.

PAVEMENT LIFE CYCLE

PAVEMENT CONDITION vs TREATMENT SELECTION



PROGRAM ANALYSIS – WORST FIRST APPROACH

WORST FIRST approach:

- Only addresses those with 0 RSL
- Most expensive way to maintain network
- Few lane miles covered per year
- Deterioration of the entire network

** They are **PROJECT BASED** decisions

** Roadway Network is driven by project level decisions

PROGRAM ANALYSIS – PAVEMENT PRESERVATION

PAVEMENT PRESERVATION:

- SLOWS DOWN THE RATE OF PAVEMENT DETERIORATION
- Fix MINOR defects before they become MAJOR
- Best use of available funds - Less Costly alternatives
- Keep the Good sections Good/Better

** They are NETWORK BASED decisions

** Require system optimization by analysis, modeling and simulation with varying inputs

** Depend on Budget and Policy Inputs

** Staff Training and QA/QC

QUESTIONS

?