Construction Analysis for Pavement Rehabilitation Strategies

(Input and Output Screenshots)

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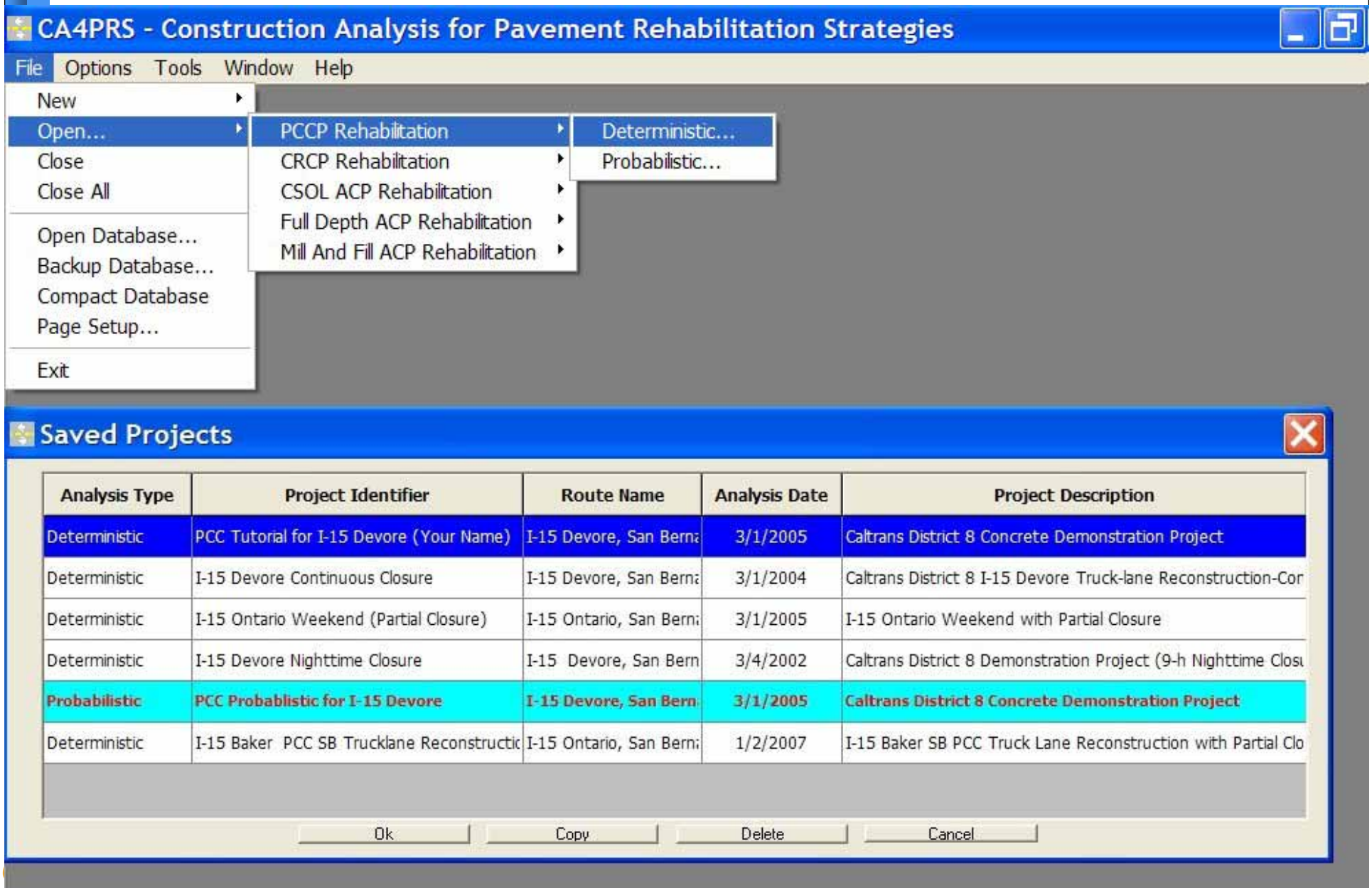
Schedule Analysis: Project List



Analysis Type	Project Identifier	Route Name	Analysis Date	Project Description
Deterministic	PCC Tutorial for I-15 Devore (Your Name)	I-15 Devore, San Bern	3/1/2005	Caltrans District 8 Concrete Demonstration Project
Deterministic	I-15 Devore Continuous Closure	I-15 Devore, San Bern	3/1/2004	Caltrans District 8 I-15 Devore Truck-lane Reconstruction-Cor
Deterministic	I-15 Ontario Weekend (Partial Closure)	I-15 Ontario, San Bern	3/1/2005	I-15 Ontario Weekend with Partial Closure
Deterministic	I-15 Devore Nighttime Closure	I-15 Devore, San Bern	3/4/2002	Caltrans District 8 Demonstration Project (9-h Nighttime Closu
Probabilistic	PCC Probablistic for I-15 Devore	I-15 Devore, San Bern	3/1/2005	Caltrans District 8 Concrete Demonstration Project
Deterministic	I-15 Baker PCC SB Trucklane Reconstructic	I-15 Ontario, San Bern	1/2/2007	I-15 Baker SB PCC Truck Lane Reconstruction with Partial Clo

Schedule Analysis: Project Details Inputs

PCCP Deterministic - PCC Tutorial for I-15 Devore (Your Name)

Project Identifier: PCC Tutorial for I-15 Devore (Your Name)

Unit: English / Metric

Project Details | Scheduling | Resource Profile | Analysis

Project Description: Caltrans District 8 Concrete Demonstration Project

Analyst Name: Your Name

Analysis Date: 3 / 1 /2005

Route Name: I-15 Devore, San Bernardino

Begin KM: 206.00

End KM: 211.00

Objective (lane-km): 17.00

Location: Deveore, San Bernardino, County, CA

Project Notes:
2 truck-lanes reconstruction out of 4 lanes
Total scope=17 lane-km = 4.3 (2.5 + 1.8) x 2 lanes x 2 directions

Save | Close

Schedule Analysis: Scheduling Inputs

PCCP Deterministic - PCC Tutorial for I-15 Devore (Your Name)

Project Identifier: PCC Tutorial for I-15 Devore (Your Name)

Unit: English / Metric

Project Details | Scheduling | Resource Profile | Analysis

Mobilization

Mobilization (Hours):	4.0
Demobilization (Hours):	6.0

Construction Start Date: 10/ 3 /2005

Construction Window...

Lag Times for Sequential Method (Finish to Start)

Demolition to PCCP Installtion (Hours):	3.0
Base Paving Included	
Demolition to New Base Installation (Hours):	3.0
New Base Installation to PCCP Installation (Hours):	2.0

Lag Times for Concurrent Method (Start to Start)

Demolition to PCCP Installtion (Hours):	12.0
Base Paving Included	
Demolition to New Base Installation (Hours):	10.0
New Base Installation to PCCP Installation (Hours):	9.0

Construction Window Settings

Weekend Closure

Start Time on Friday:	10:00 PM
End Time on Monday:	05:00 AM
Available Hours:	55.0

Nighttime Closure

Start Time on First Day:	07:00 PM
End Time on Next Day:	05:00 AM
Available Hours per Day:	10.0

Continuous Closure/Continuous Operation

Start Time on First Day:	12:00 AM
No. of Continuous Work Days:	3.0
Available Hours per Day:	24.0

Continuous Closure/Shift Operation

Daily Start Time:	06:00 AM
No. of Continuous Work Days:	6.0
Available Hours per Day:	9.0

Schedule Analysis: Resources Inputs

Mill And Fill Deterministic - MACO - Weekend Closure (Your name)

Project Identifier: MACO - Weekend Closure (Your name)

Unit: English / Metric

Project Details | Scheduling | Resource Profile | Analysis

Milling and Hauling

Number of Team:	1.0
Team Efficiency:	1.00

Milling Machine

Machine Class:	Large
Material Type:	AC - Medium
Efficiency Factor for Downtimes:	0.70

Hauling Truck

Rated Capacity (tonne)	24.0
Trucks per Hour per Team:	12.0
Packing Efficiency:	0.75

Batch Plant

Capacity (tonne/hour):	300.0
Number of Plants:	1

HMA Delivery Truck

Rated Capacity (tonne)	24.0
Trucks per Hour:	12
Packing Efficiency:	0.90

Paver

Non Paving Travel Speed (kph)	29.0

Schedule Analysis: Analysis Inputs (PCC)

PCCP Deterministic - PCC Tutorial for I-15 Devore (Your Name)

Project Identifier: PCC Tutorial for I-15 Devore (Your Name)

Unit: English / Metric

Project Details | Scheduling | Resource Profile | Analysis

Construction Window
- Weekend Closure
- Nighttime Closure
- Continuous Closure/Continuous Operation
- Continuous Closure/Shift Operation

Curing Time
- 4-Hours
- 8-Hours
- 12-Hours
- User Defined 24.0 Hours

Section Profile
- 203 mm (8 inches)
- 254 mm (10 inches)
- 305 mm (12 inches)

User Defined
- User Defined
- PCCP (mm): 290.0
- Treated Base (mm): 152.4

Additional Demolition
- Additional Demolition
- Depth (mm): 100.0

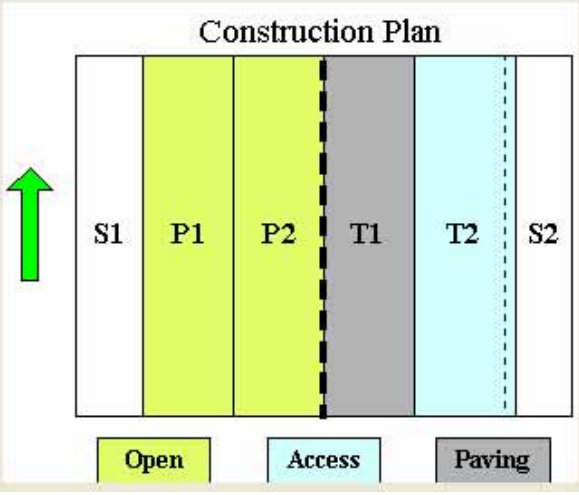
Lane Widths
- T1 Width (m): 3.7
- T2 Width (m): 3.7

Working Method
- Sequential Single Lane (T1)
- Sequential Single Lane (T2)
- Sequential Double Lane (T1+T2)
- Concurrent Single Lane (T1)
- Concurrent Single Lane (T2)

Save

Construction Plan

- Sequential Single Lane (T1)
- Sequential Single Lane (T2)
- Sequential Double Lane (T1+T2)
- Concurrent Single Lane (T1)
- Concurrent Single Lane (T2)
- Concurrent Double Lane (T1+T2)



Schedule Analysis: Scheduling Inputs (AC)

Mill And Fill Deterministic - MACO - Weekend Closure (Your name)

Project Identifier: MACO - Weekend Closure (Your name)

Unit: English / Metric

Project Details | Scheduling | Resource Profile | Analysis

Construction Window
- [x] Weekend Closure
- [ ] Nighttime Closure
- [ ] Continuous Closure/Continuous Operation
- [ ] Continuous Closure/Shift Operation

Working Method
- [x] Full Closure
- [ ] Half Closure/Full Co
- [ ] Half Closure/Partial
- No

Section Profile
- Define... [x] Profile A
- Define... [ ] Profile B

Change in Roadway Elevation: No Change / Down / Up — Change (mm): 25.4

Cooling Time Analysis
- User Specified
- MultiCool Computed — MultiCool Data...

Lane Widths — No of Lanes: 2 — Lane Width...

Shoulder Overlay
- Pre-paving
- Simultaneous Paving

Shoulder Width (m): Inside 3.05

Analyze...

Compare...

Lane Widths

Lane Number	Lane Width (m)
1	3.66
2	3.66

Ok | Cancel

ACP Layer Definition - Profile A

Lift Number	Lift Thickness (mm)	Lift Name	Lift Cooling Time (hour)	Paver Speed (kph)
3	25.40	RAC-O	0.50	7.48
2	76.20	Type-C	2.00	4.43
1	50.80	Type-C	1.00	5.95
	Total: 152.40		Average: 1.17	Average: 5.95

Schedule Analysis: AC Cooling-time

MultiSet Date

Construction Start Date: 7/17/2003

Latitude (Deg North): 40

Existing Surface

Material Type: PCCP

Moisture Content: Dry

Moisture State: Unfrozen

Surface Temperature (C): 21.1

Mix Specifications

Mix Type: Dense Graded

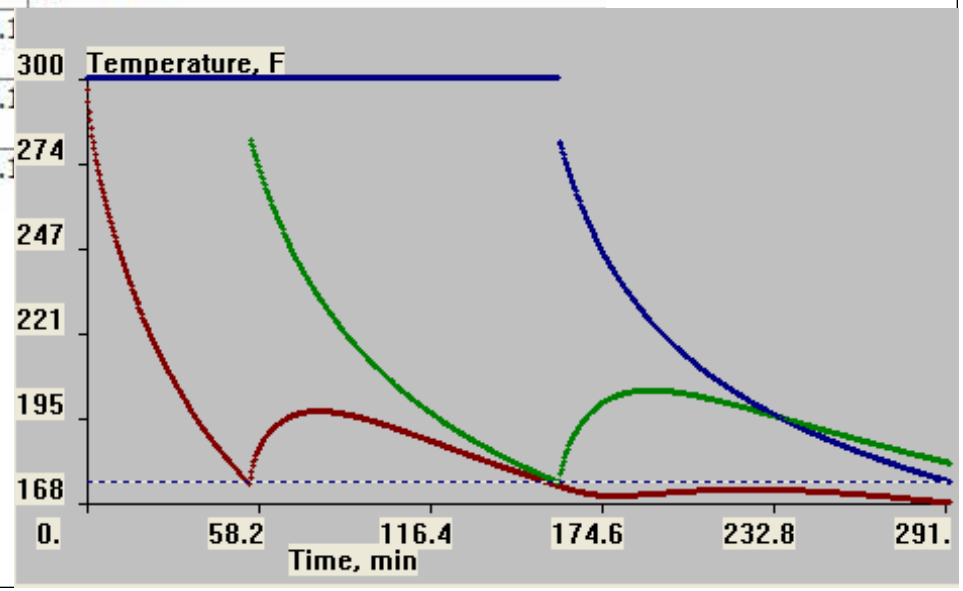
Delivery Temperature (C): 148.89

Stop Temperature (C): 73.89

Open to Traffic Temperature (C): 61

Environmental Condition

Period	Time	Ambient Temperature (C)	Average Wind Speed (kph)	Sky Conditions
1	12:00 AM	12.8	8.1	Clear & Dry
2	06:00 AM	15.6	8.1	
3	12:00 PM	26.7	8.1	
4	06:00 PM	18.3	8.1	



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Schedule Outputs: Deterministic Analysis

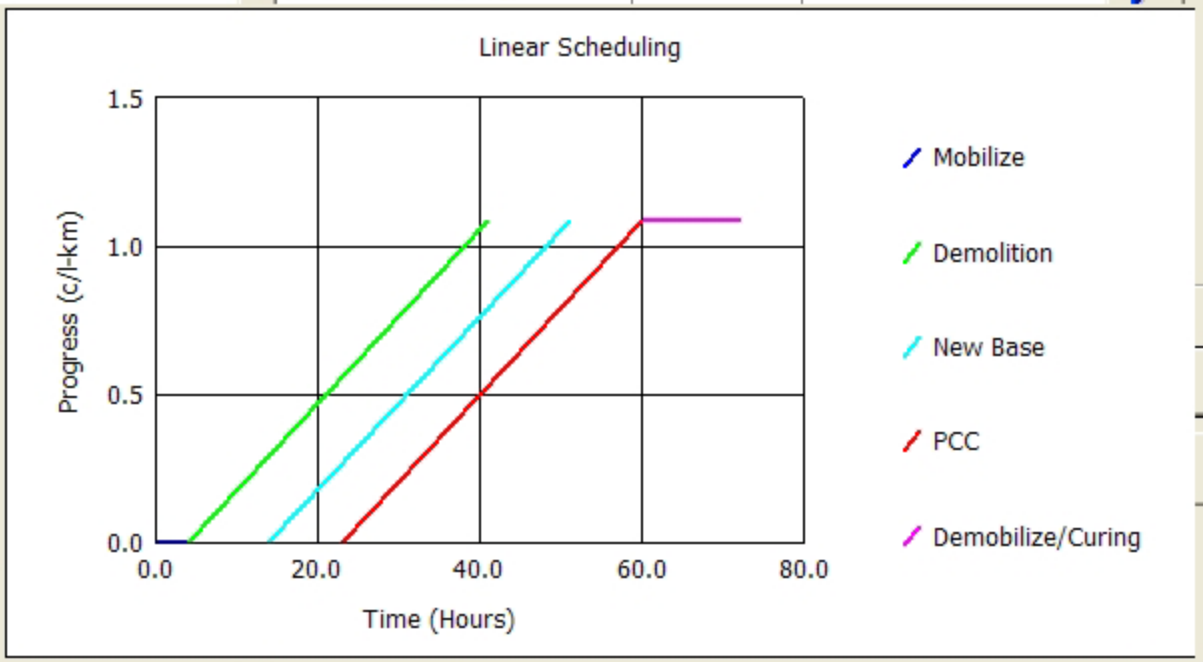
Resource Utilization - PCC Tutorial for I-15 Devore (Your Name)

Project Identifier: PCC Tutorial for I-15 Devore (Your Name)

Production Details | Production Chart | Gantt Chart

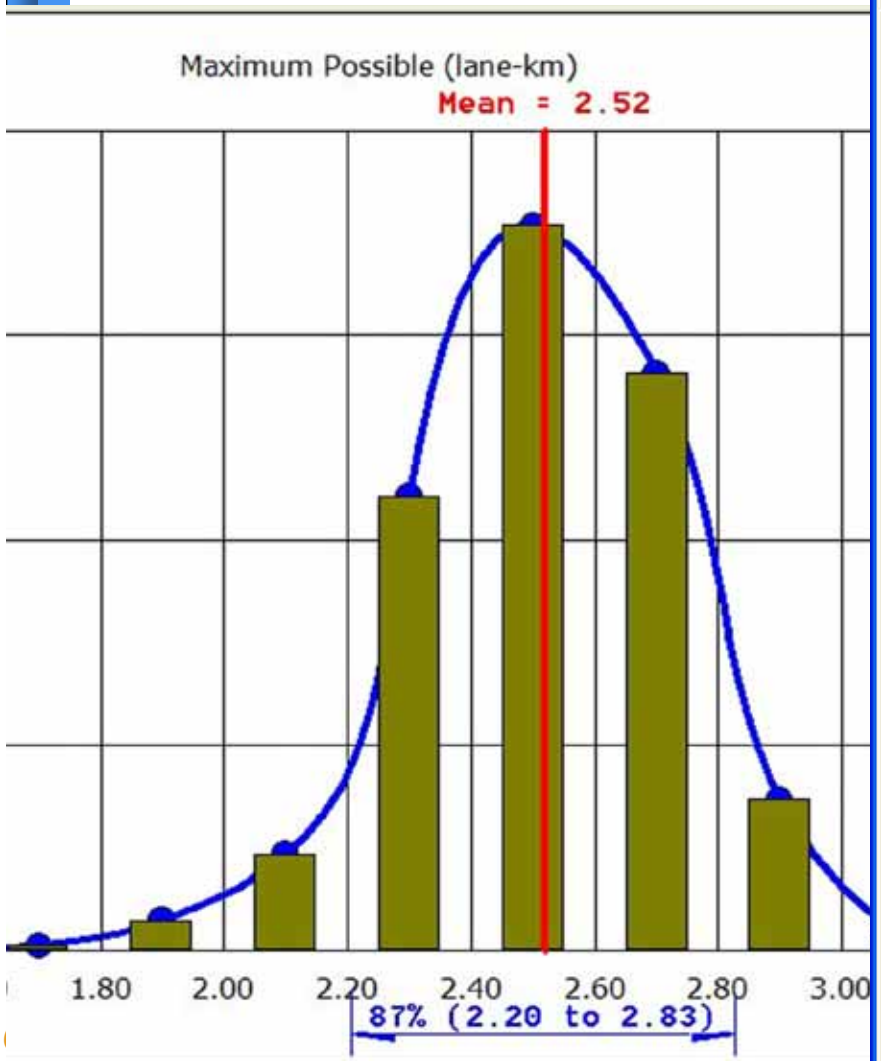
Construction Window:	**Continuous Closure/Continuous Operation**
Working Method:	**Concurrent Double Lane (T1+T2)**
Section Profile:	**305 mm (12 inches)**
Curing Time:	**12-Hours**
Objective (lane-km):	**17.00**
Maximum Possible (lane-km):	**2.16**
Maximum Possible (c/l-km):	**1.08**
Construction Windows Needed To Meet Objective:	**7.86**
Demolition Quantity (cu. m):	**3920.1**
New Base Quantity (cu. m):	**1306.7**
Concrete Quantity (cu. m):	**2613.4**
Constraint Resource:	**Demolition Hauling**
Demolition to Paving:	**N/A**
Demolition Hours:	**37.0**
Paving Hours:	**37.0**

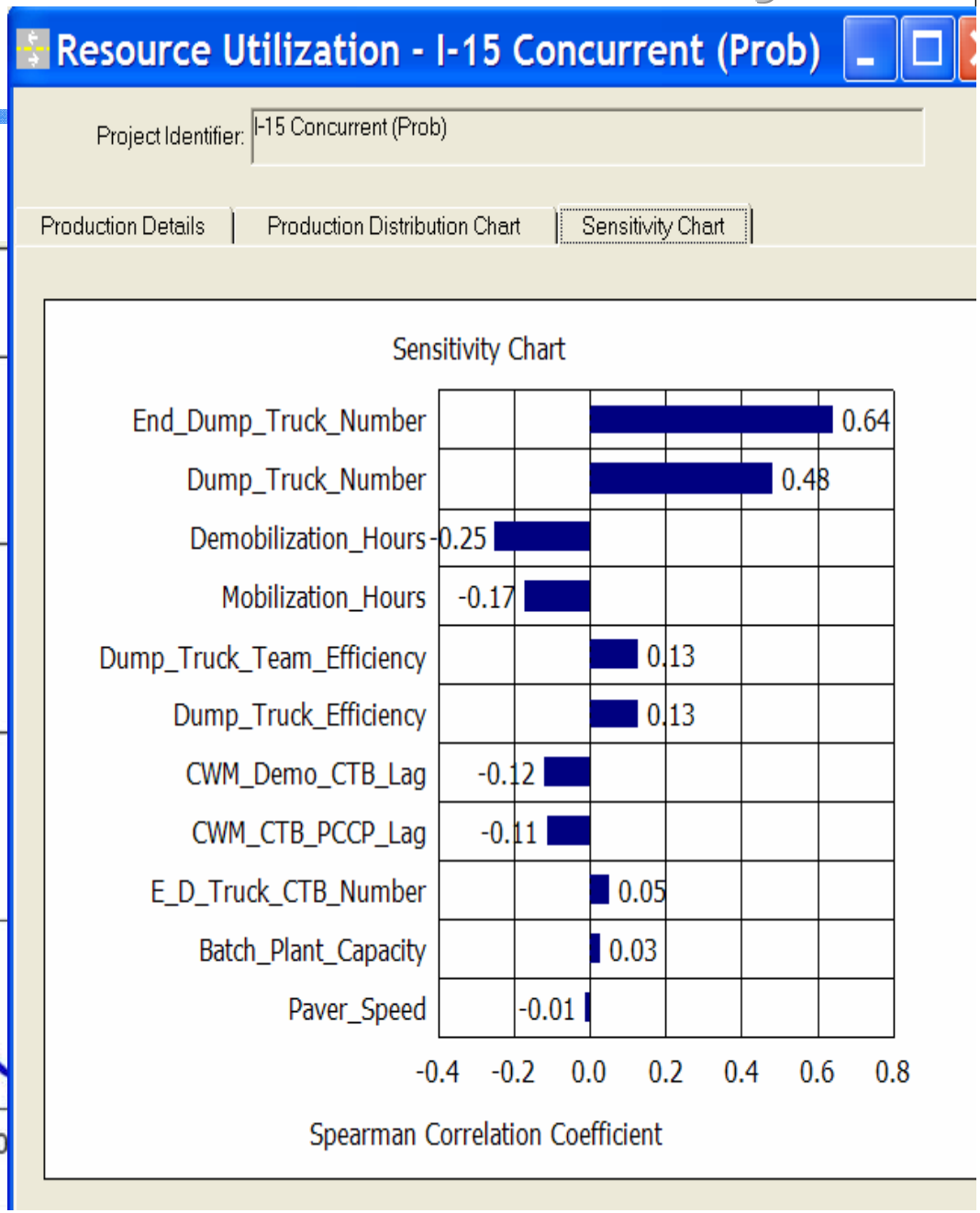
Resource	Allocated	Utilized
Demolition Hauling Truck (per hour per team)	10.0	10.0
Base Delivery Truck (per hour)	10.0	3.9
Batch Plant (cu-m/hour)	90.0	70.6
Concrete Delivery Truck (per hour)	15.0	11.8
Paver Speed (m/min)	2.0	0.5



Report... | Close

Schedule Outputs : Probabilistic Analysis





Traffic Analysis Inputs

DEMAND-CAPACITY MODEL

Before Construction

Direction 1: Northbound
Number of Lanes: 4

Direction 2: Southbound
Number of Lanes: 4

Speed Limit (MPH): 65

During Construction

Speed Limit (MPH): 55
Length(mile): 2
Closure Duration(days): 3
Number of Closures
Direction 1: 4
Direction 2: 4
Construction Begin: this yr

Traffic Inputs

Growth Rate (year,%): 3
Traffic Reduction on CWZ(%)
No show up: 5
Detour: 5

Traffic Counts
Hourly Traffic Graph
Lane Closure Chart

Vehicle Cost Input

Passenger Car($): 9
Commercial Truck($): 24
Proportion of Truck (%): 10

Capacity Information

Capacity
Single Lane open: 1800 veh/hr/ln
Multi Lanes open: 2100 veh/hr/ln

Capacity (Construction)
Single Lane open: 1142 veh/hr/ln
Multi Lanes open: 1523 veh/hr/ln

Capacity Calculation

RUN
OUTPUT
EXIT

Traffic Inputs: Hourly Counts and Lane Closures

Construction Input

Lane Closure Period

Select number of lanes for both directions during construction: 5

Select number of lanes per direction by time.

	Direction 1 (NB)	Direction 2 (SB)		Direction 1 (NB)	Direction 2 (SB)
12:00-01:00AM	3	2	12:00-01:00P	3	2
01:00-02:00AM	3	2	01:00-02:00P	3	2
02:00-03:00AM	3	2	02:00-03:00P	3	2
03:00-04:00AM	3	2	03:00-04:00P	3	2
04:00-05:00AM	3	2			
05:00-06:00AM	3	2			
06:00-07:00AM	3	2			
07:00-08:00AM	3	2			
08:00-09:00AM	3	2			
09:00-10:00AM	3	2			
10:00-11:00AM	3	2			
11:00-12:00PM	3	2			

Demand Input Window

You may type or load demands from the sheet.

Hourly Demand

	Direction 1 Northbound	Direction 2 Southbound		Direction 1 Northbound	Direction 2 Southbound
12:00-01:00AM	651	556	12:00-01:00P	2843	2932
01:00-02:00AM	389	608	01:00-02:00PM	3521	2937
02:00-03:00AM	454	935	02:00-03:00PM	4585	3041
03:00-04:00AM	699	2251	03:00-04:00P	4872	3138
04:00-05:00AM	1279	3740	04:00-05:00P	4680	2903
05:00-06:00AM	1702	4419	05:00-06:00PM	3418	2086
06:00-07:00AM	2039	4281	06:00-07:00P	2459	1454
07:00-08:00AM	2123	2985	07:00-08:00P	2059	1352
08:00-09:00AM	2134	2596	08:00-09:00P	1717	1173
09:00-10:00AM	2501	2536	09:00-10:00P	1334	1027
10:00-11:00AM	2681	2498	10:00-11:00P	1003	682
11:00-12:00PM	2676	2522	11:00-12:00A	620	651
			SUM	52439	53303

Clean demands

Load demands

If hourly counts are not availabl

CA historical data

OK

Cancel

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Traffic Analysis Outputs

RUC Estimation Output

Before Construction

Direction 1

Northbound

Average Queue Length: 0 miles

Max. Delay/Veh/Closure: 0 min. at 0

Total User Delay: $0.00 USD

Direction 2

Southbound

Average Queue Length: 0 miles

Max. Delay/Veh/Closure: 0 min. at 0

Total User Delay: $0.00 USD

During Construction

Direction 1

Northbound

Average Queue Length: 6 miles

Max. Delay/Veh/Closure: 73 min. at 05:00-06:00PM

Total User Delay: $2,125,055.00 USD

Direction 2

Southbound

Average Queue Length: 3 miles

Max. Delay/Veh/Closure: 42 min. at 06:00-07:00AM

Total User Delay: $948,524.00 USD

Total Differences

Direction 1

Northbound

Average Queue Length: 6 miles

Max. Delay/Veh/Closure: 73 min.

Total User Delay: $2,125,055.00 USD

Direction 2

Southbound

Average Queue Length: 3 miles

Max. Delay/Veh/Closure: 42 min.

Total User Delay: $948,524.00 USD

Graphical Output

Demand-Capacity Curve | Demand Sensitivity | Capacity Sensitivity

For printing output, please go to "FINAL OUTPUT" sheet.

Close

More Information?

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- **GOOGLE "CA4PRS"**

http://www.dot.ca.gov/research/roadway/ca4prs/index.htm