Site Simulation

Computerized Productivity and Cost Calculations

VOLVO CONSTRUCTION EQUIPMENT

SITE SIMULATION

An Earthmoving Business Approach

What is Site Simulation?

- A computer simulation of a customers earth moving operations

- A total solution for Volvo or existing equipment calculations for your site

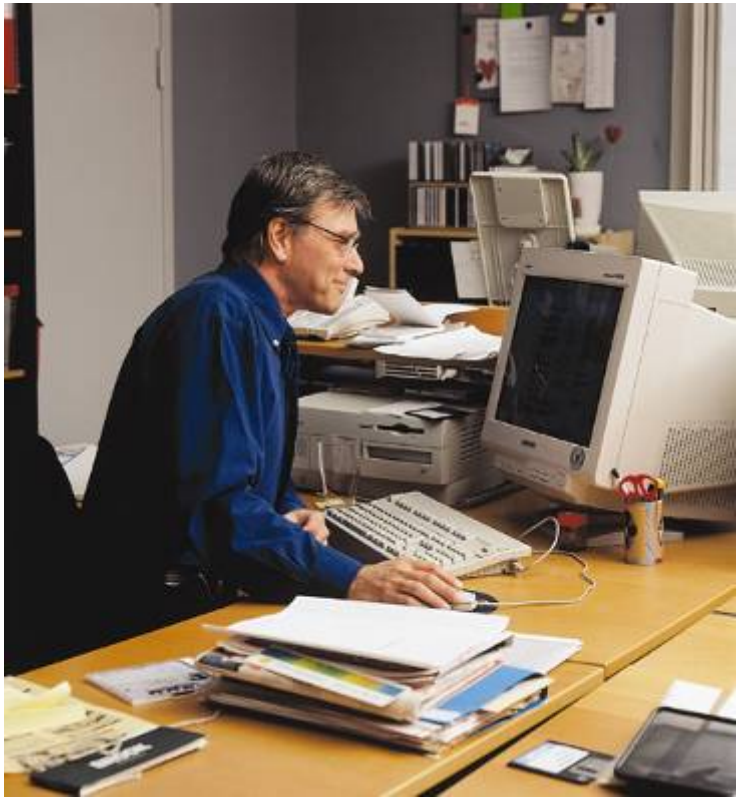
Simulation scenarios

- **Load and Haul**
- **Load and Carry**
- **Forestry Timber Handling**
- **Trenching**

Why use Volvo Site Simulation?

- Real time solutions and best practices for the job site
- Focus on lowest cost and optimized production
- Consistent analysis of cases – site to site and changing conditions
- Gives you the ability to determine your equipment needs and your estimated operating costs
    - Productivity and/or time to remove a required target
    - Fleet suggestions with size & number of units
    - Cycle times & cycles per hour
    - Estimated cost per unit (cost/ton, cost/cubic meter)
    - Identifying bottle necks for loading & hauling units
    - Fuel consumption estimation

Customer Value

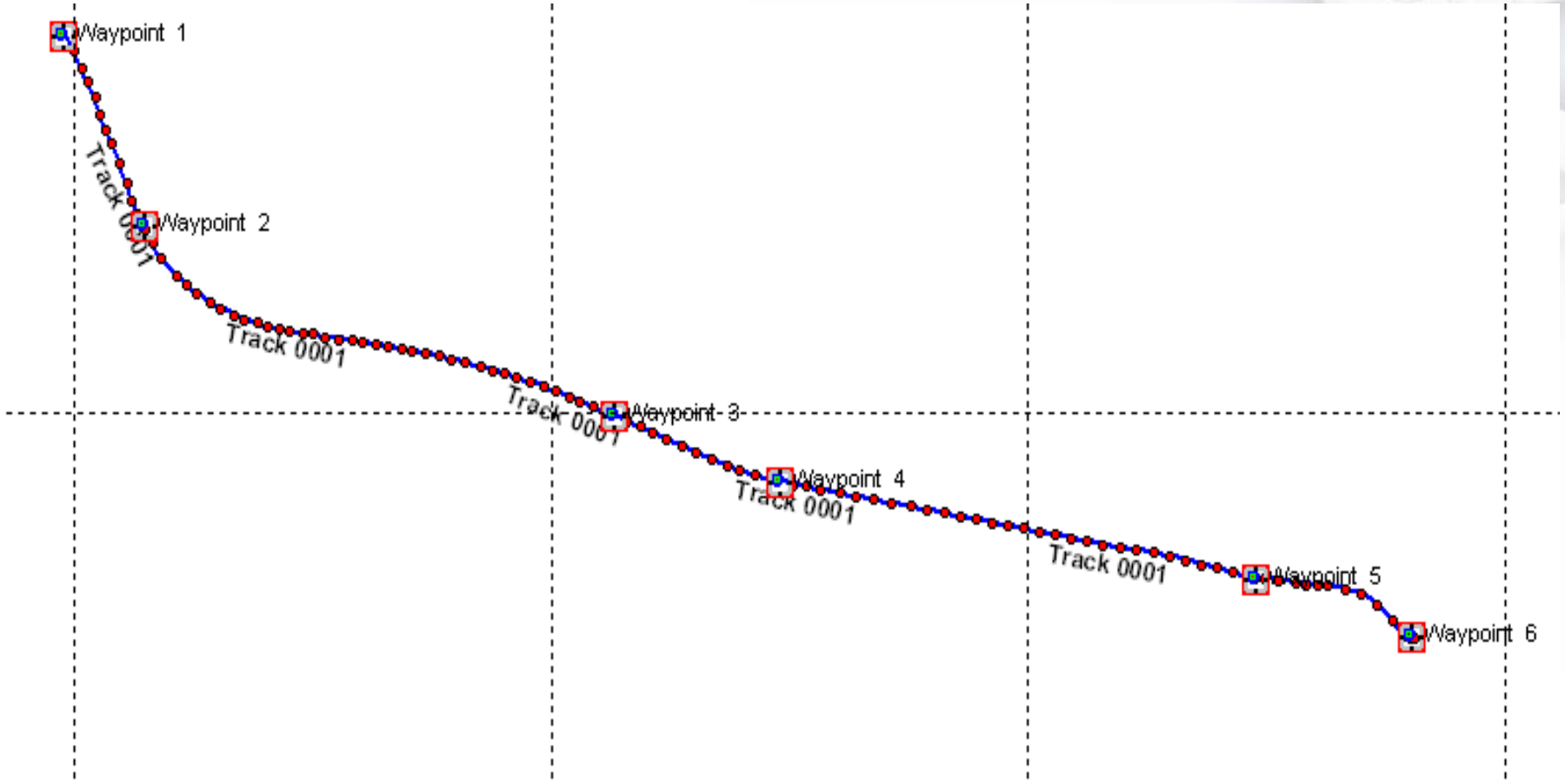


- **Enhanced overview of your operations**
- **Shortened time needed for in-depth analysis**
- **Maximized production of a fleet of equipment**
- **Reduced cost by analyzing different scenarios**

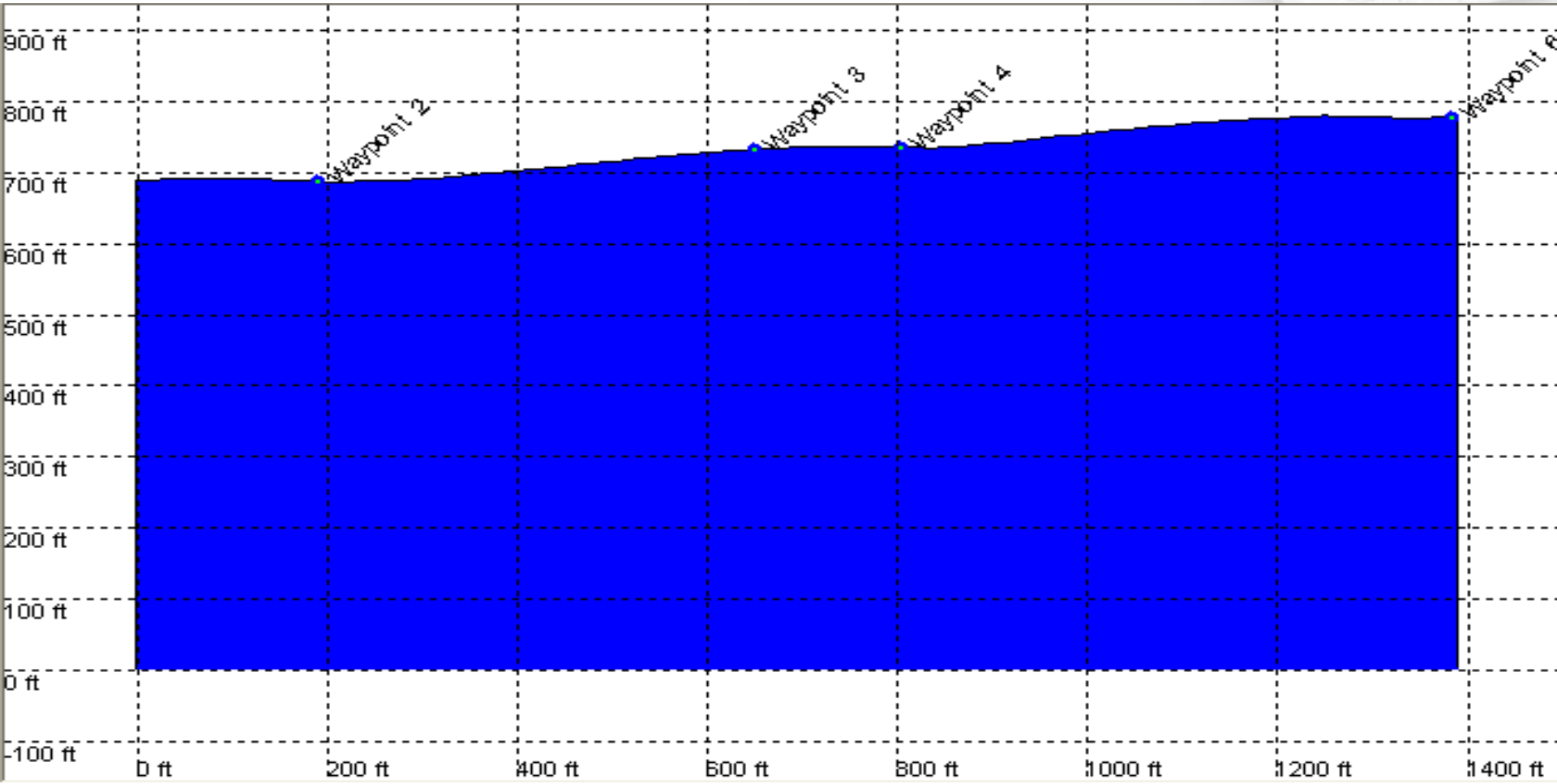
Lowest $/ton = TCO

Aerial Photo of Kennesaw Quarry GA

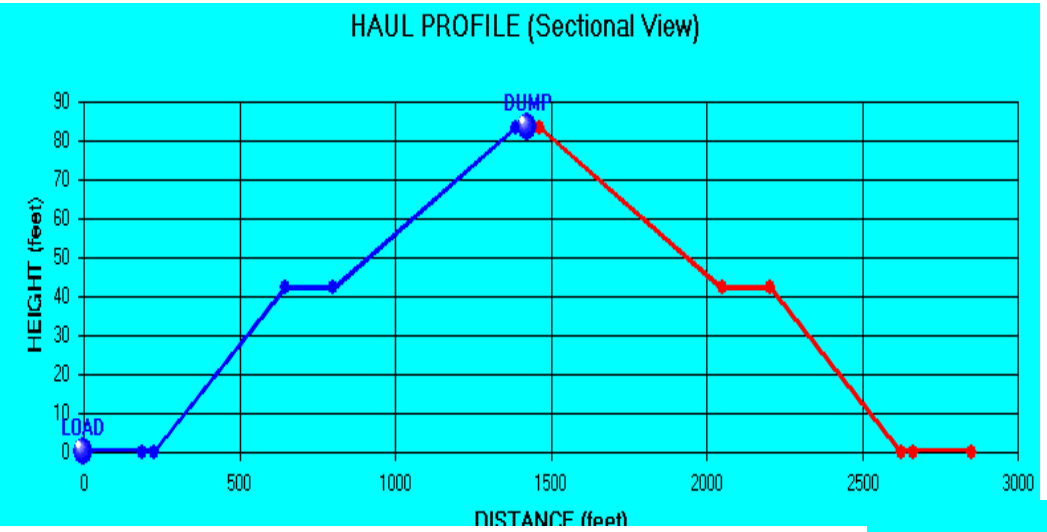
GPS reading of Haul Route

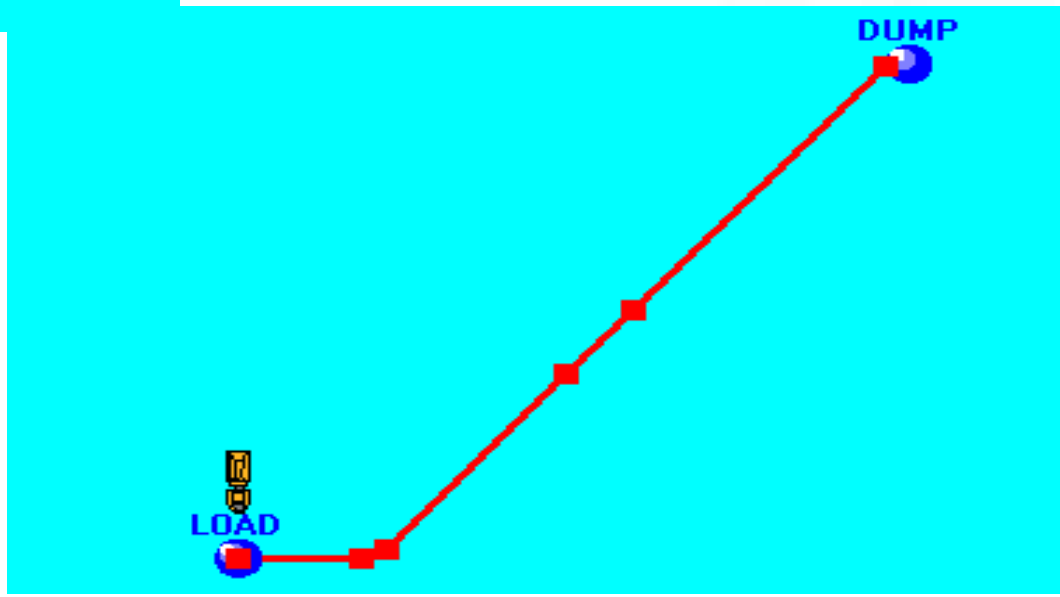


Altitude readings from actual haul route

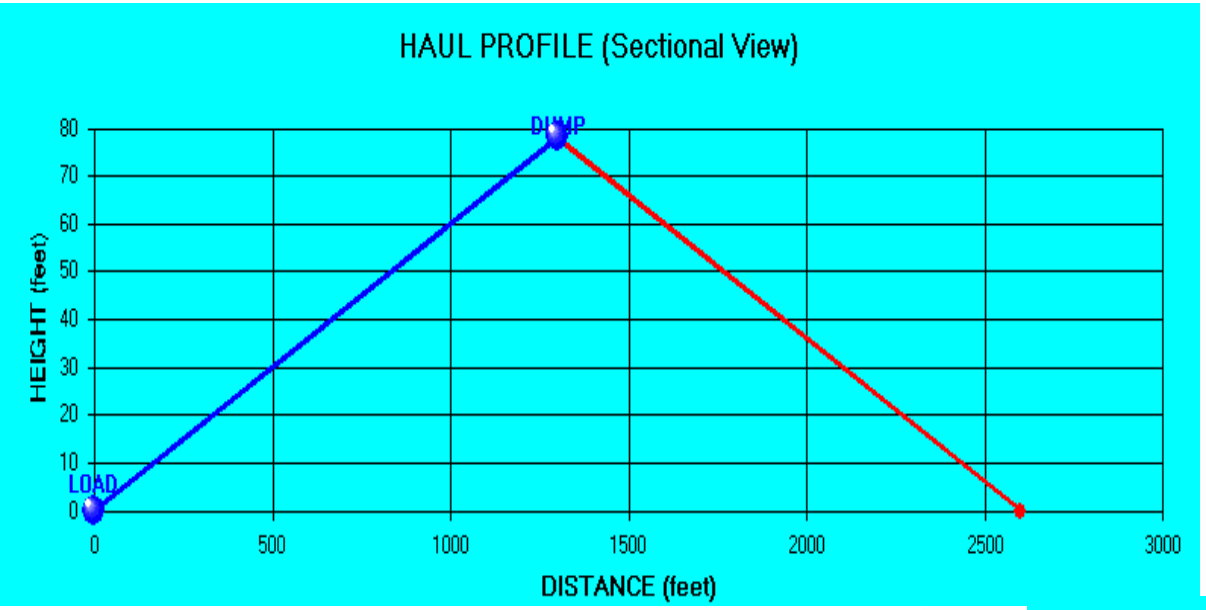


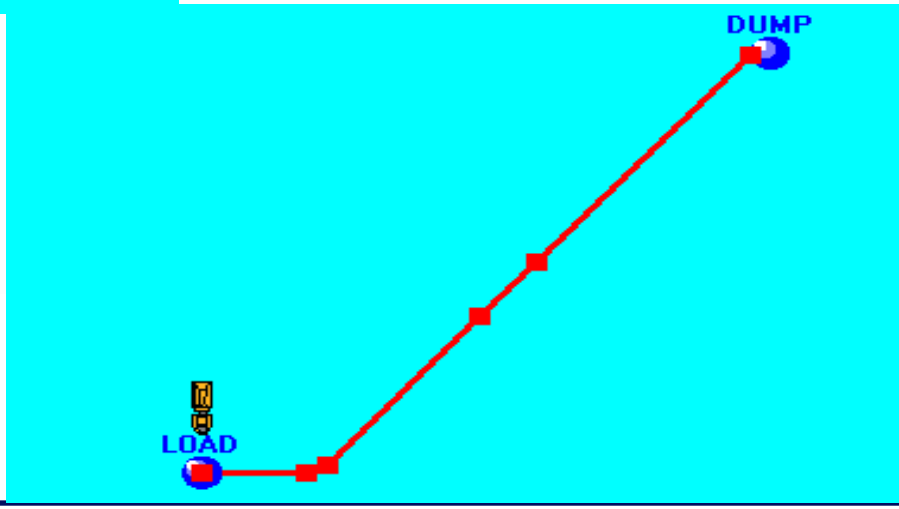
Haul route in Site Simulation





Improved haul route at 6% grade





Data produced with 6% grade route

Actual Haul				6% haul route			
Hauling analysis				Hauling analysis			
Unit		A40E		Unit		A40E	
Availability		100		Availability		100	
Cap		31.39		Cap		31.39	
Payload		41.87		Payload		41.87	
Cycle time		7.16		Cycle time		5.49	
Trips/hr		8.38		Trips/hr		10.93	
Prod/hr		351		Prod/hr		458	
Avr Fuel/hr		6.45		Avr Fuel/hr		7.4	
Production/hr		351.16	tons	Production/hr		458.41	tons
Production/shift		3,336	tons	Production/shift		4355	tons
Production/year		2,592,056	tons	Production/year		2,255,848	tons

Advantages with the new improved haul route

- 2 minute faster cycle times
- The truck utilization goes up so much that you can actually remove a unit from the fleet. This is why the tons per year are less slightly there is one less truck.
- If you loose the haul unit it saves these items, cost upfront of the truck,1 operator, fuel, repair and maintenance. If this is multiplied over 6 years of service it can be a substantial savings.
- 100 tons more per hour to feed the crusher to meet the requirement of 450 tons per hour.
- The only trade off is your fuel cost of 1 gallon per hour. But you are running one less truck

Let's talk Load & Carry
Needing to produce 600 tons per hour

Carry Distance		650 feet	550 feet	450 feet	350 feet	250 feet
Material Density	lb/cu.yd	2,700.00	2,700.00	2,700.00	2,700.00	2,700.00
Effective Working Time	hh:mm	8:00	8:00	8:00	8:00	8:00
Loading Unit		VOLVO L350F	VOLVO L350F	VOLVO L350F	VOLVO L350F	VOLVO L350F
Average Production per Year	US.ton/Year	1,649,646	1,821,919	2,025,515	2,276,094	2,578,877
Owning / Rental Cost	$/US.ton	0.05	0.05	0.04	0.04	0.03
Operating Cost	$/US.ton	0.3	0.27	0.24	0.21	0.18
Total Cost	$/US.ton	0.36	0.32	0.28	0.25	0.22
Avg. Production per Operating Hour	US.ton	440.35	486.33	540.68	607.57	688.39
Fuel usage per cycle:	US.gals	0.4	0.36	0.32	0.28	0.23
Production per US.gal:	US.tons	29.4	32.21	36.04	41.78	50.18

Customer Makes decision on Data from L&C Site Sim

- When the process of Carrying reaches 650 feet the factors of profit and loss coupled with wear and tear on the loader force a new process to be considered.
- It is at that point (650 ft) all factors push them into installing the next section of transfer belts to reduce the haul route for the loader.
- Essentially the cost of operating at 650 feet doubles, plus the production level can not be met.

Thanks for your time

Questions?