

Small Paving		
Description	Quantity	Units
CAT AP-1055 Asphalt Paver	1	EA
Vibratory Roller 1-3 TN	1	EA
Skip Loader	1	EA
Kick Broom	1	EA
Oil Pot Trailer	1	EA
2 MGAL Water Truck	1	EA
Foreman Truck	1	EA
Transfer Truck & Trailer	3	EA
Foreman Operator	1	EA
Operator	2	EA
Laborer	3	EA
Teamster	3	EA
Material:		
Asphalt		TN
Oil		TN
Water		MGAL
Options:		
Traffic Control Items		
Safety Manager	1	EA
Quality Control	1	EA

Fine Grade		
Description	Quantity	Units
CAT 623 Scraper	1	EA
CAT 14H Blade	1	EA
Sheep Foot Roller	1	EA
4 MGAL Water Truck	1	EA
Foreman Truck	1	EA
Topcon GPS	1	EA
Foreman Operator	1	EA
Operator	2	EA
Grade Checker	1	EA
Teamster	1	EA
Material:		
Water		MGAL
Options:		

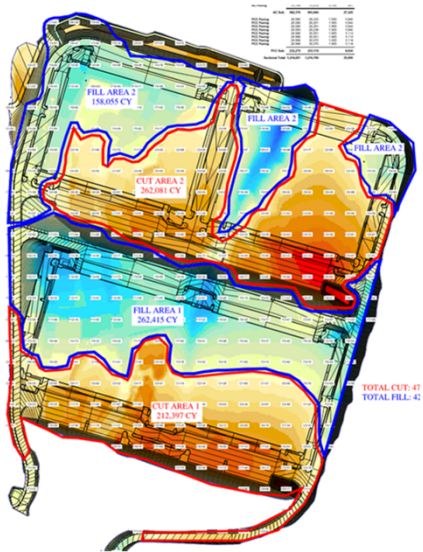
Examples of
Typical Crews
Resource
Sheet

Heavy Civil Estimating Learning Module for
CM 314

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In the past, through past engagement with students that have gone through the CM 314 class, it has been found that student understanding of typical heavy civil operations is subpar. Through an updated course module that focuses on estimating the four major operations, Earthwork, Underground, Asphalt, and Concrete, Students will gain a deeper understanding of the heavy civil field of construction. The module consists of four assignments that pertain to the previously mentioned operations, a lecture detailing typical crew compositions and cycle times, and reference material and resources the students can use when completing the assignments. This new module will challenge students critical thinking skills and give them a deeper understanding of heavy civil operations.

Key Words: Estimating, Heavy Civil, Course, Templates, Production Rate



Earthwork Assignment

Truck Takeoff - (Supplier 1)			Truck Takeoff - (Supplier 2)			Truck Takeoff - (Supplier 3)		
Take Off Information			Take Off Information			Take Off Information		
Operation Quantity	9858	Tons	Operation Quantity	9858	Tons	Operation Quantity	9858	Tons
Total Operation Hours	56	Hr	Total Operation Hours	56	Hr	Total Operation Hours	56	Hr
Load Capacity	18	Tons	Load Capacity	18	Tons	Load Capacity	18	Tons
Cycle Time			Cycle Time			Cycle Time		
Trip Time	20	Min	Trip Time	45	Min	Trip Time	30	Min
Load	5	Min	Load	5	Min	Load	5	Min
Haul	15	Min	Haul	15	Min	Haul	15	Min
Dump	15	Min	Dump	15	Min	Dump	15	Min
Haul	15	Min	Haul	15	Min	Haul	15	Min
Total Roundtrip	40	Min	Total Roundtrip	65	Min	Total Roundtrip	50	Min
Truck Roundtrip	0.66666667		Truck Roundtrip	1.08333333		Truck Roundtrip	0.83333333	
Loads/Truck per Hour	1.5		Loads/Truck per Hour	0.92307692		Loads/Truck per Hour	1.2	
Total Number of Loads needed	548		Total Number of Loads needed	548		Total Number of Loads needed	548	
Loads needed Per Hour	9.785714286		Loads needed Per Hour	9.785714286		Loads needed Per Hour	9.785714286	
# of Trucks Needed	7		# of Trucks Needed	11		# of Trucks Needed	9	
Price/Unit	\$ 9.50		Price/Unit	\$ 8.65		Price/Unit	\$ 9.10	
Total Material Price	\$ 93,651.00		Total Material Price	\$ 85,271.70		Total Material Price	\$ 89,707.80	
Trucking cost/HR	\$ 95.00		Trucking cost/HR	\$ 95.00		Trucking cost/HR	\$ 95.00	
Total Trucking Cost	\$ 37,240.00		Total Trucking Cost	\$ 58,520.00		Total Trucking Cost	\$ 47,880.00	
TOTAL PRICE (Material + Trucking)	\$ 130,891.00		TOTAL PRICE (Material + Trucking)	\$ 143,791.70		TOTAL PRICE (Material + Trucking)	\$ 137,587.80	

Truck Take-Off Calculator

DESCRIPTION	Quantity	Units	Hours	Labor Unit Cost	Equipment Unit Cost	Material Unit Cost	Labor	Equipment	Subs	Materials	Total
BID ITEM 16" Cast In Drilled Hole Concrete Pile	88.00	LF					4,504.08	3,922.20		7,574.63	16,000.91
Item direct unit cost	181.83	LF									
Material Buy Out Package											
Rebar #6 - Vertical	380.00	LF			\$ 0.84					\$ 319.20	\$ 319.20
Rebar #6 - Spiral	7000.00	LF			\$ 0.84					\$ 5,880.00	\$ 5,880.00
Concrete	5.00	CY			\$ 150.00					\$ 750.00	\$ 750.00
Notes: 10% Waste Factor										Tax	\$ 625.43
										Section total	\$ 7,574.63
Work Package #1											
Operation 2.1 Drill Piles											
Operation Quantity	5.00	CY									
Operation Duration	1.00	Days									
Labor Man Hours	16.00	Hours									
Productivity	5.00	Units / Day									
Productivity	0.63	Units / Hr									
Unit Cost	309.04	\$/Unit									
Laborer	1.00		8.00	\$ 27.30			\$ 218.40				\$ 218.40
Equip Operator/ Foreman	1.00		8.00	\$ 37.60			\$ 300.80				\$ 300.80
Continuous Flight Auger, CM-50	1.00				\$ 128.25			\$ 1,026.00			\$ 1,026.00
Notes: Assume Soil is good and doesn't need Slurry mix Assume Soil can be reused on site.										Section total	\$ 1,545.20

Master Estimating Template