

QANT- 610

AGGREGATE PLANNING PROJECT

CORNWELL GLASS

Submitted by

Hong Xu

4, 4, 4, 4

Karan Galani

4, 4, 4, 4

Vinitkumar Patel

4, 4, 4, 4

GIVEN DATA

Holding cost	\$0.12 per pound
Expediting Cost	\$25 per pound per week
Hiring Cost	\$200 per pound
Setup Cost	\$20 per pound
Overtime Cost	\$2 per pound
Subcontracted Cost	\$2 more per pound than glass manufactured during overtime
Current Inventory	73 units

Lets take a look at the forecast

Week		Demand	Week		Demand
April	15	1,829		14	1,689
	22	1,820		21	1,754
	29	1,887		28	1,800
May	6	1,958	November	4	1,864
	13	2,011		11	1,989
	20	2,063		18	2,098
	27	2,104		25	2,244
June	3	2,161	December	2	2,357
	10	2,258		9	2,368
	17	2,307		16	2,387
	24	2,389		23	2,402
July	1	2,434		30	2,418
	8	2,402	January	6	2,417
	15	2,385		13	2,324
	22	2,330		20	2,204
	29	2,323		27	2,188
August	5	2,317	February	3	2,168
	12	2,222		10	2,086
	19	2,134		17	1,954
	26	2,065		24	1,877
September	2	1,973	March	3	1,822
	9	1,912		10	1,803
	16	1,854		17	1,777
	23	1,763		24	1,799
	30	1,699		31	1,803
October	7	1,620	April	7	1,805

Constraints

Manufacturing Capacity	1900 pounds per week
Subcontract Limit	2000 pounds per week
Overtime Limit	250 pounds per week

ANALYSIS

Given data suggests that holding cost is relatively lower than other costs
Let us now analyze the case with the help of the three plans below and then determine the best and cost effective plan for CORNWELL

PLAN 1 – Chase Plan with no modification

Week		Demand	Beginning Inventory	Regular Time	Hiring	Firing	Week		Demand	Regular Time	Hiring	Firing
April	15	1,829	73	1900	0	144		14	1,689	1900	0	211
	22	1,820		1900	0	80		21	1,754	1900	0	146
	29	1,887		1900	0	13		28	1,800	1900	0	100
May	6	1,958		1900	58	0	November	4	1,864	1900	0	36
	13	2,011		1900	111	0		11	1,989	1900	89	0
	20	2,063		1900	163	0		18	2,098	1900	198	0
	27	2,104		1900	204	0		25	2,244	1900	344	0
June	3	2,161		1900	261	0	December	2	2,357	1900	457	0
	10	2,258		1900	358	0		9	2,368	1900	468	0
	17	2,307		1900	407	0		16	2,387	1900	487	0
	24	2,389		1900	489	0		23	2,402	1900	502	0
July	1	2,434		1900	534	0		30	2,418	1900	518	0
	8	2,402		1900	502	0	January	6	2,417	1900	517	0
	15	2,385		1900	485	0		13	2,324	1900	424	0
	22	2,330		1900	430	0		20	2,204	1900	304	0
	29	2,323		1900	423	0		27	2,188	1900	288	0
August	5	2,317		1900	417	0	February	3	2,168	1900	268	0
	12	2,222		1900	322	0		10	2,086	1900	186	0
	19	2,134		1900	234	0		17	1,954	1900	54	0
	26	2,065		1900	165	0		24	1,877	1900	0	23
September	2	1,973		1900	73	0	March	3	1,822	1900	0	78
	9	1,912		1900	12	0		10	1,803	1900	0	97
	16	1,854		1900	0	46		17	1,777	1900	0	173
	23	1,763		1900	0	137		24	1,799	1900	0	101
	30	1,699		1900	0	201		31	1,803	1900	0	97
October	7	1,620		1900	0	280	April	7	1,805	1900	0	85

Hiring Cost	\$5.63 per pound
Firing Cost	\$15.73 per pound

Hence,

Total Hiring Cost = $10752 \times 5.63 = \$60533.76$

Total Firing Cost = $2008 \times 15.73 = \$31,585.84$

Total Cost of the plan is Total Hiring Cost + Total Firing Cost = \$92,119.60

PLAN 1 = \$92,000

(NOT FEASIBLE)

PLAN 2 – Mixed Plan Strategy with Subcontracting and Overtime

This plan implies to use overtime and subcontracting for units exceeding 1900 units
This suggests that Overtime is preferred over subcontracting owing to the costs

		OVERTIME AND SUBCONTRACTING					
Week		DEMAND	REGULAR TIME	OVERTIME	SUBCONTRACTING	BEGINNING INVENTORY	HOLDING
April	15	1,829	1900	0	0	73	144
	22	1,820	1900	0	0	144	224
	29	1,887	1900	0	0	224	237
May	6	1,958	1900	0	0	237	179
	13	2,011	1900	0	0	179	68
	20	2,063	1900	95	0	68	0
	27	2,104	1900	204	0	0	0
June	3	2,161	1900	250	11	0	0
	10	2,258	1900	250	108	0	0
	17	2,307	1900	250	157	0	0
	24	2,389	1900	250	239	0	0
July	1	2,434	1900	250	284	0	0
	8	2,402	1900	250	252	0	0
	15	2,385	1900	250	235	0	0
	22	2,330	1900	250	180	0	0
	29	2,323	1900	250	173	0	0
August	5	2,317	1900	250	167	0	0
	12	2,222	1900	250	72	0	0
	19	2,134	1900	250	0	0	16
	26	2,065	1900	149	0	16	0
September	2	1,973	1900	73	0	0	0
	9	1,912	1900	12	0	0	0
	16	1,854	1900	0	0	0	46
	23	1,763	1900	0	0	46	183
	30	1,699	1900	0	0	183	384
October	7	1,620	1900	0	0	384	664
	14	1,689	1900	0	0	664	875
	21	1,754	1900	0	0	875	1,021
	28	1,800	1900	0	0	1021	1,121
November	4	1,864	1900	0	0	1121	1,157
	11	1,989	1900	0	0	1157	1,068
	18	2,098	1900	0	0	1068	870
	25	2,244	1900	0	0	870	526

EFFECTIVE OVERTIME

Week		DEMAND	REGULAR TIME	OVERTIME	SUBCONTRACTING	BEGINNING INVENTORY	HOLDING
April	15	1,829	1900	250	0	73	394
	22	1,820	1900	250	0	394	724
	29	1,887	1900	250	0	724	987
May	6	1,958	1900	250	0	987	1,179
	13	2,011	1900	250	0	1179	1,318
	20	2,063	1900	250	0	1318	1,405
	27	2,104	1900	250	0	1405	1,451
June	3	2,161	1900	250	0	1451	1,440
	10	2,258	1900	250	0	1440	1,332
	17	2,307	1900	250	0	1332	1,175
	24	2,389	1900	250	0	1175	936
July	1	2,434	1900	250	0	936	652
	8	2,462	1900	250	0	652	400
	15	2,385	1900	250	0	400	165
	22	2,330	1900	250	15	165	0
	29	2,323	1900	250	173	0	0
August	5	2,317	1900	250	167	0	0
	12	2,222	1900	250	72	0	0
	19	2,134	1900	234	0	0	0
	26	2,065	1900	165	0	0	0
September	2	1,973	1900	73	0	0	0
	9	1,912	1900	12	0	0	0
	16	1,854	1900	0	0	0	46
	23	1,763	1900	0	0	46	183
	30	1,699	1900	0	0	183	384
October	7	1,620	1900	0	0	384	664
	14	1,689	1900	0	0	664	875
	21	1,754	1900	0	0	875	1,021
	28	1,800	1900	207	0	1021	1,328
November	4	1,864	1900	250	0	1328	1,614
	11	1,989	1900	250	0	1614	1,775
	18	2,098	1900	250	0	1775	1,827
	25	2,244	1900	250	0	1827	1,733
December	2	2,357	1900	250	0	1733	1,526
	9	2,368	1900	250	0	1526	1,308

November	28	1,800	1900	207	0	1021	1,328
	4	1,864	1900	250	0	1328	1,614
	11	1,989	1900	250	0	1614	1,775
	18	2,098	1900	250	0	1775	1,827
	25	2,244	1900	250	0	1827	1,733
December	2	2,357	1900	250	0	1733	1,526
	9	2,368	1900	250	0	1526	1,308
	16	2,387	1900	250	0	1308	1,071
	23	2,402	1900	250	0	1071	819
	30	2,418	1900	250	0	819	551
January	6	2,417	1900	250	0	551	284
	13	2,324	1900	250	0	284	110
	20	2,254	1900	250	0	110	56
	27	2,168	1900	250	0	56	18
February	3	2,168	1900	250	0	18	0
	10	2,066	1900	186	0	0	0
	17	1,954	1900	54	0	0	0
	24	1,877	1900	0	0	0	23
March	3	1,822	1900	0	0	23	101
	10	1,803	1900	0	0	101	198
	17	1,777	1900	0	0	198	321
	24	1,799	1900	0	0	321	422
	31	1,803	1900	0	0	422	519
April	7	1,805	1900	0	0	519	614

TOTAL			8931	427	32949
--------------	--	--	-------------	------------	--------------

		PER UNIT COST	\$8	\$10	\$0.12
--	--	---------------	-----	------	--------

OVERTIME COST	=	\$71,448
---------------	---	----------

SUBCONTRACTING COST	=	\$4,270
---------------------	---	---------

HOLDING COST	=	\$3,953.88
--------------	---	------------

TOTAL COST	=	\$79,671.88
-------------------	----------	--------------------

Total Subcontracting units: 427 units

Total Overtime Units: 8,931 units

Total Holding Units: 32,949 units

Cost of subcontracting units: 427 units x \$ 10 = \$4270,
 Cost of Overtime units: 8,931 units x \$ 8 = \$71,448
 Cost of Holding units: 32,949 units x \$ 0.12 = \$3,953.88
Total cost = \$79,671.88

PLAN 3 - \$80,000

CONCLUSION

The production schedule that Cornwell should follow under the various assumptions and policies, along with detailed differences among these schedules is the most cost effective plan out of the three

Lets see the plan results

PLAN COMPARISON

Cost	Plan1	Plan2	Plan3
Holding	0	\$1,326	\$3,953.88
Overtime	0	\$48,184	\$71,448
Subcontracting	0	\$33,350	\$4,270
Hiring	\$60,533.76	0	0
Firing	\$31,585.84	0	0
Total Cost	\$92,000	\$82,000	\$80000

BEST PLAN

Hence Cornwell should choose the third plan