CEE 538
Lab 6: THE WAREHOUSE PROJECT
Part 2: Resource-Restrained Scheduling after the Change Order

P.G. Ioannou — November 25, 2025
Fall 2025 — Due: December 4, 2025

In Lab 6 – Part 2 of the Warehouse Project (described in Lab 6 – Part 1) you will consider the effects of the *Change Order* that was issued by the owner at the time of the *Notice to Proceed*.

Activities affected by Change Order	Original Duration	New Duration	Duration Increase	Free Float (for comparison)
03-Fabricate interior wall partition [4C]	2d	8d	6d	15d
07-Fabricate exterior doors [2C]	2d	7d	5d	17d
08-Const. plywood ext. wall panel [4C]	3d	12d	9d	14d
29-Erect interior wall partitions [4C]	1d	4d	3d	4d

The owner agrees to pay the additional costs caused by the *Change Order* but refuses to allow any time extension. At this point, you become concerned about possible resource availability. **Each day you can only provide 4 carpenters (C), 4 ironworkers (I), and 4 laborers (L).**

Because the increases in activity durations caused by the *Change Order* were within the activity free floats shown in the original 28-day schedule submitted by the contractor, the owner agreed to pay the additional costs, but refused to allow any time extension, claiming that successor activities would not be delayed from their ESD and thus project duration should remain at 28 days. Clearly, this ignores that (a) the contractor would perform the project with limited resources and (b) that increasing the "work content" (the total resource-days of work) for a project with limited resources can increase project duration (sometimes, significantly).

Fondahl's article states that the Change Order for the Warehouse Project had the following effects because of limited resources:

- Based on the required resource-days, no project duration could be less than 47 days.
- Manual leveling (without splitting activities) resulted in project duration of 50 days.
- Leveling by P3 (without splitting activities) produced a duration of 52 days.

MS Project Pro Tasks

- Copy the MS Project 28-day early-start schedule from Lab 6 Part 1
- Delete Activity 12A that represents the time for concrete to cure.
  Rename Activity 12B to "12-After cure strip footings [1L]" and make it preceded by Activity "11-Pour footings [1C,2L]".
  Change the Link (11,12) to FS with LT=3d to represent the time for concrete to cure. (MS Project calls the "3d" a link "lag"). Thus, a "finish-to-start link with a lead time" makes the Warehouse Project have exactly 30 activities (as in Fondahl'article).
- Increase the durations of the four activities affected by the *Change Order* as described in the case study.
- Use MS project to level the resources for the Warehouse Project (without splitting activities). This should increase project duration to 54 days.
- Increase the Priority of Activity 3 to 600 and level the resources for the Warehouse Project again. This should decrease project duration to 50 days.

P6 Pro Tasks

- Copy the P6 28-day early-start schedule from Part 1
- Delete Activity 12A that represents the time for concrete to cure.
  Rename Activity 12B to "12-After cure strip footings [1L]" and make it preceded by Activity "11-Pour footings [1C,2L]".
  Change the Link (11,12) to FS with LT=3d to represent the time for concrete to cure. (P6 calls the "3d" a link "lag"). Thus, a "finish-to-start link with a lead time" makes the Warehouse Project have exactly 30 activities (as in Fondahl'article).
- Increase the durations of the four activities affected by the Change Order as described in the case study.
- Level the resources in P6 using the default P6 settings for resource leveling. The resulting project duration should be 63 days!
- Change the criterion for leveling to "Total Float".
  Set "Preserve scheduled early and late dates" to "No".
  Perform repeated leveling in P6 until project duration equals 50 days.
- Important: The order by which activities are sorted in P6 affects the leveling. To get a duration of **50 days**, activities must be sorted as follows: Early Start (or Baseline Start): *ascending*: Activity ID (which must match the IDs in the reports): *ascending*.

In the Lab Description Provide Short Answers to the Following (easy) Questions (1-12):

Use the MS Project Resource Usage report to verify that the Warehouse Project (after the Change Order) has a total amount of 160 resource-days of work for the carpenters (more than double the 78 resource-days before the Change Order).
Consider also the following:

- Activity "*Site survey & material list*" (1d) and its successor activity "*Material & equipment to site*" (3d), must precede all other activities in the network and that both activities do not require any carpenters.
- There is only one finish activity, "*Cleanup*" (2d), which is a successor to all other activities, and it does not require any carpenters, either.

Based on these observations alone,

1. Given that there are only 4 carpenters available, what is the minimum possible duration for the Warehouse Project, even if it were possible to split each of the rest of the activities as many times as might be needed to accommodate the limited availability of carpenters?
2. How should these simple observations be presented to the project owner by the contractor to explain the impact of the Change Order on the project schedule and the increase of the project duration from 28d to 50d? Explain.
3. The following table shows the duration of the project (after the change order) produced by MS Project (with default and with priority leveling), P6 (with default and with TF leveling), Fondahl's manual leveling, and P3. What do you conclude?

MS Project Default	MS Project Priority(A03)=600	P6 Pro Default	P6 Pro TF Leveling	Fondahl (Manual)	P3 Leveling
54d	50d	63d	50d	50d	52d

4. Compare the two solutions produced by MS Project. Compare the two solutions produced by P6 Pro. What are some practical conclusions for users of these programs?

To answer the questions below, using the following quotes from Fondahl's article:

"The changes made [by the Change Order] were all within the activity's […] free float periods. [Yet] Because resource restrictions governed, the project was actually extended in duration by almost 80%. In such a situation, it is quite likely that neither contractor nor owner, in the absence of a resource-leveled schedule, would fully appreciate just why the project was gradually turning into a disaster.
This brings up another related problem. *Few of even those who claim to be "CPM experts" fully appreciate the fact that in a resource-restrained schedule the concept of float breaks down and quite often the concept of a critical path breaks down.*"

5. What does Fondahl mean by: "*in a resource-restrained schedule the concept of float breaks down*"?
6. What does Fondahl mean by: "*in a resource-restrained schedule… the concept of a critical path breaks down*"?

"Since almost all construction projects are resource-restrained, at least to some extent, this becomes a source of major problems. The classic legal question in recent years, as well as the subject of numerous professional papers, is, "*Who owns float time*?" It is difficult to claim ownership of something that might not exist or that hasn't been quantified properly."

7. What does Fondahl mean by: "*It is difficult to claim ownership of something that might not exist or that hasn't been quantified properly.*"?

These are fundamental matters that after 30 years still don't seem to be understood.
More importantly, the results shown in these simple problems indicate that the conventional concepts of *"float time"* break down in a resource-constrained project. "*Float times"* may be much less than those computed, or may not exist at all, and *project duration may not be determined by the conventionally calculated critical path*. Again, since almost any construction project either must be resource-leveled to achieve a feasible solution or should be resource-leveled to achieve an economic solution, we have a problem that is almost always present but seems to be universally ignored. Some, and often many, of the conventional CPM data are not valid. The originally calculated network data, including float data, are useful as a basis for establishing and applying priority rules in heuristic leveling procedures. *However, once leveling has been performed, float times may have little meaning.*

8. What does Fondahl mean by: "*The originally calculated network data, including float data, are useful as a basis for establishing and applying priority rules in heuristic leveling procedures. However, once leveling has been performed, float times may have little meaning.*"?

Provide short answers to the following questions related to Fondahl's Article

9. Consider observations (5), (7), and (8). What do you conclude about floats in resource-restrained construction schedules?
10. Given your answer above, what is the best way to define "*Critical Activities*"? (See Fondahl's article for the answer.)
11. Given observation (6), under what (simplifying) conditions does a schedule *really* have a "*Critical Path*", and what then is the appropriate (complete) definition of a "*Critical Path*" (= longest path)?
12. Is there a critical path in your MS Project and P6 schedules after the resources are leveled? Explain your answer.

Lab 6-Part 2 Assignment Deliverables

1. Lab 6 Part 2 Report (one PDF file submitted on Canvas)

Start with a discussion that describes the project and the change order. Describe the five scheduling reports by MS Project and P6 and explain how they were produced and why. Use the following scheduling reports to provide answers to all the numbered questions above.

MS Project: Three "Gantt Chart and Resource Usage" combination reports (like the ones for Part 1) for the 28-day, 54-day, and 50-day schedules (no network report is needed).

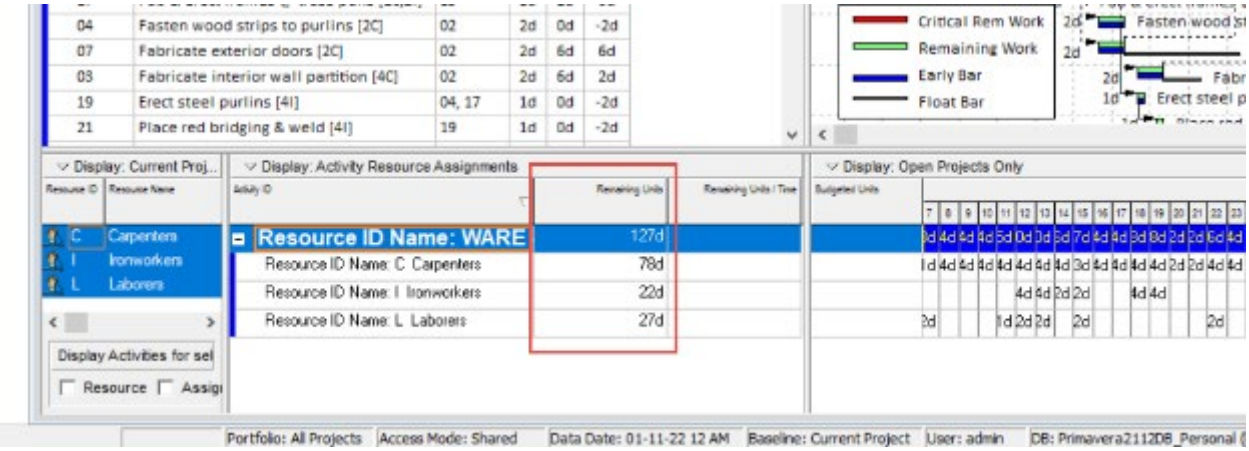
P6 Pro: Two "Gantt Chart and Resource Spreadsheet" combination reports (like the ones for Part 1) one for the 63-day schedule and one for the 50-day schedule (i.e., one report for leveling using the default settings and one report for leveling using TF as the leveling criteria).

2. ZIP file (sent through email to photios@umich.edu)

As usual.

Notes for P6 — Columns for the "Resource Usage Spreadsheet"

The column "Remaining Units" in the "Resource Usage Spreadsheet" (shown in the screenshot below) shows the resource-days for the three resources C, I, L (for example, the total work for the carpenters is 78 resource-days — this is before the change order).



The column "Remaining Units" is the appropriate column field to include in your report.

The above screenshot also shows the column field "Remaining Units / Time" to illustrate that it is blank and does not show any numbers for the three resources C, I, L. The reason the field "Remaining Units / Time" cannot be shown in a single column is because it changes from day to day and cannot be shown as a single value in one column.

Thus, the column "Remaining Units / Time" is **not** the appropriate column to show in your reports. It is blank.

MS Project Pro | Project: Warehouse Project | Date: 7/25/25

ID	Act	Pred	T	Lev	ESD	PSD	LSD	EFD	PFD	LFD	FF	TF
0	**Warehouse Project**		**28d**	**0ed**	**0**	**0**	**0**	**0**	**0**	**0**	**0d**	**0d**
1	01-Site survey & material list		1d	0ed	0	0	0	1	1	1	0d	0d
2	02-Material & equipment to site	1	3d	0ed	1	1	1	4	4	4	0d	0d
3	03-Fabricate interior wall partition [4C]	2	8d	0ed	4	29	14	12	37	22	9d	10d
4	04-Fasten wood strips to purlins [2C]	2	2d	0ed	4	11	15	6	13	17	8d	11d
5	05-Fabricate timber trusses [4C]	2	4d	0ed	4	7	11	8	11	15	4d	7d
6	06-Excavate [4L]	2	1d	0ed	4	4	4	5	5	5	0d	0d
7	07-Fabricate exterior doors [2C]	2	7d	0ed	4	37	16	11	44	23	12d	12d
8	08-Const. plywood ext. wall panel [4C]	2	12d	0ed	4	15	9	16	27	21	5d	5d
9	09-Forms, rebar & bolts for col ftgs [4C,2I,2L]	6	1d	0ed	5	5	5	6	6	6	0d	0d
10	10-Place drain pipes [SUB]	6	1d	0ed	5	5	10	6	6	11	5d	5d
11	11-Pour footings [1C,2L]	9	1d	0ed	6	6	6	7	7	7	0d	0d
12	12-Strip footings [1L]	11FS+3d	1d	0ed	10	10	10	11	11	11	0d	0d
13	13-Erect steel cols & vert brace [4I]	12	1d	0ed	11	11	13	12	12	14	0d	2d
14	14-Backfill, compact & grade slab [2L]	10,12	2d	0ed	11	11	11	13	13	13	0d	0d
15	15-Erect trusses [4I]	13,5	1d	0ed	12	12	15	13	13	16	0d	3d
16	16-Forms, rebar & drains floor slab [4C,2I]	14	1d	0ed	13	13	13	14	14	14	0d	0d
17	17-Fab & erect frames @ truss pans [2C,2I]	15	1d	0ed	13	14	16	14	15	17	0d	3d
18	18-Pour slab [1C,2L]	13,16	1d	0ed	14	14	14	15	15	15	0d	0d
19	19-Erect steel purlins [4I]	4,17	1d	0ed	14	15	17	15	16	18	0d	3d
20	20-Cure slab	18	6d	0ed	15	15	15	21	21	21	0d	0d
21	21-Place red bridging & weld [4I]	19	1d	0ed	15	16	18	16	17	19	0d	3d
22	23-Nail planks to purlins [2C]	21	2d	0ed	16	27	19	18	29	21	0d	3d
23	26-Lay tar paper on planks [2L]	22	1d	0ed	18	29	21	19	30	22	0d	3d
24	28-Erect corrugated roofing [2C]	23	2d	0ed	19	46	24	21	48	26	5d	5d
25	22-Erect ext. wall panels [4C]	20,8	2d	0ed	21	44	21	23	46	23	0d	0d
26	29-Erect interior wall partitions [4C]	3,20,23	4d	0ed	21	48	22	25	52	26	1d	1d
27	24-Erect doors [2C]	7,25	1d	0ed	23	46	23	24	47	24	0d	0d
28	25-Waterproof & insulate joints [2L]	25	1d	0ed	23	46	23	24	47	24	0d	0d
29	27-Paint ext. walls [SUB]	27,28	2d	0ed	24	47	24	26	49	26	0d	0d
30	30-Cleanup [4L]	29,24,26	2d	0ed	26	52	26	28	54	28	0d	0d

Green bars show the leveled activity positions that MS Project will choose when leveling (without splits) to give project duration T=54d (from T=28d).
How to produce this barchart:
Define the green bars to show the "preleveled" start and finish of activities.
Level the project *twice* in succession and then clear the leveling to go back to the early-start schedule (T=28d).

Note: The Resource Usage spreadsheet, shown on the right, was printed to pdf separately and was pasted to the pdf for the Gantt Chart using "Bluebeam Revu". If you find this too difficult, you can print and submit the two reports separately.

ID	Resource Name	Work	Details
	Unassigned	0d	Work
1	Carpenters	160d	Work
2	Ironworkers	22d	Work
3	Laborers	27d	Work

Carpenters: 16d 20d 15d 14d 10d 10d 10d 8d 4d 10d 5d 4d 2d 2d 2d 2d 8d 8d 6d 4d
Ironworkers: 2d 4d 4d 4d 4d 4d
Laborers: 4d 2d 2d 1d 2d 2d 2d 2d 2d 4d 4d

_Lab6.4_CO_Gantt_Chart_Unleveled-T=28
Sorted by: Early Start, Name

After Change Order --- Early-Start Schedule --- Unleveled --- Project Duration T=28d --- Link(11,12): FS LT=3d

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User: P.G. Ioannou

MS Project Pro | Project: Warehouse Project | Date: 7/26/25

ID	Act	Pred	T	Lev	PSD	ESD	TSD	LSD	PFD	EFD	TFD	LFD	FF	TF
0	**Warehouse Project**		**54d**	**0ed**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0d**	**0d**
1	01-Site survey & material list		1d	0ed	0	0	0	0	1	1	1	1	0d	0d
2	02-Material & equipment to site	1	3d	0ed	1	1	1	1	4	4	4	4	0d	0d
3	03-Fabricate interior wall partition [4C]	2	8d	25ed	4	4	29	29	12	37	37	37	0d	0d
4	04-Fasten wood strips to purlins [2C]	2	2d	7ed	4	4	11	17	6	13	13	19	2d	6d
5	05-Fabricate timber trusses [4C]	2	4d	3ed	4	4	7	12	8	11	11	16	1d	5d
6	06-Excavate [4L]	2	1d	0ed	4	4	4	8	5	5	5	9	0d	4d
7	07-Fabricate exterior doors [2C]	2	7d	33ed	4	4	37	42	11	44	44	49	2d	5d
8	08-Const. plywood ext. wall panel [4C]	2	12d	11ed	4	4	15	18	16	27	27	30	0d	3d
9	09-Forms, rebar & bolts for col ftgs [4C,2I,2L]	6	1d	0ed	5	5	5	9	6	6	6	10	0d	4d
10	10-Place drain pipes [SUB]	6	1d	0ed	5	5	5	19	6	6	6	20	5d	14d
11	11-Pour footings [1C,2L]	9	1d	0ed	6	6	6	10	7	7	7	11	0d	4d
12	12-Strip footings [1L]	11FS+3d	1d	0ed	10	10	10	14	11	11	11	15	0d	4d
13	13-Erect steel cols & vert brace [4I]	12	1d	0ed	11	11	11	15	12	12	12	16	0d	4d
14	14-Backfill, compact & grade slab [2L]	10,12	2d	0ed	11	11	11	20	13	13	13	22	0d	9d
15	15-Erect trusses [4I]	13,5	1d	0ed	12	12	12	16	13	13	13	17	0d	4d
16	16-Forms, rebar & drains floor slab [4C,2I]	14	1d	0ed	13	13	13	22	14	14	14	23	0d	9d
17	17-Fab & erect frames @ truss pans [2C,2I]	15	1d	1ed	13	13	14	18	14	15	15	19	0d	4d
18	18-Pour slab [1C,2L]	13,16	1d	0ed	14	14	14	23	15	15	15	24	0d	9d
19	19-Erect steel purlins [4I]	4,17	1d	0ed	14	15	15	19	15	16	16	20	0d	4d
20	20-Cure slab	18	6d	0ed	15	15	15	24	21	21	21	30	6d	9d
21	21-Place red bridging & weld [4I]	19	1d	0ed	15	16	16	20	16	17	17	21	0d	4d
23	23-Nail planks to purlins [2C]	21	2d	10ed	16	17	27	31	18	29	29	33	0d	4d
26	26-Lay tar paper on planks [2L]	23	1d	0ed	18	29	29	33	19	30	30	34	0d	4d
28	28-Erect corrugated roofing [2C]	26	2d	16ed	19	30	46	50	21	48	48	52	4d	4d
22	22-Erect ext. wall panels [4C]	20,8	2d	17ed	21	27	44	47	23	46	46	49	0d	3d
29	29-Erect interior wall partitions [4C]	3,20,26	4d	11ed	21	37	48	48	25	52	52	52	0d	0d
24	24-Erect doors [2C]	7,22	1d	0ed	23	46	46	49	24	47	47	50	0d	3d
25	25-Waterproof & insulate joints [2L]	22	1d	0ed	23	46	46	49	24	47	47	50	0d	3d
27	27-Paint ext. walls [SUB]	24,25	2d	0ed	24	47	47	50	26	49	49	52	3d	3d
30	30-Cleanup [4L]	27,28,29	2d	0ed	26	52	52	52	28	54	54	54	0d	0d

MS Project Calculations (leveled) for columns in Gantt Table:
LD[i] = Leveling Delay of Act i
TSD[i] = Scheduled Start Date
TFD[i] = Scheduled Finish Date

ESD'[i] = max{ EFD'[h] }
TSD[i] = ESD'[i] + LD[i]
EFD'[i] = TFD[i] = TSD[i] + T[i]

LFD'[i] = min{ LSD'[j] - LD[j] }
LSD'[i] = LFD'[i] - T[i]
TF[i] = LFD'[i]-EFD'[i] =LFD'[i]-TFD[i]
Act i is Critical if TF[i]<=0

After the Change Order.
Green bars show the preleveled (i.e., early) positions of activities (T=28d) before "MS Project leveling" (without splits) resulted in T=54d.
How to produce this barchart:
Define the green bars to show the "preleveled" start and finish of activities. Level the project *once*.

Note: The Resource Usage spreadsheet, shown on the right, was printed to pdf separately and was pasted to the pdf for the Gantt Chart using "Bluebeam Revu".
If you find this too difficult, you can print and submit the two reports separately.

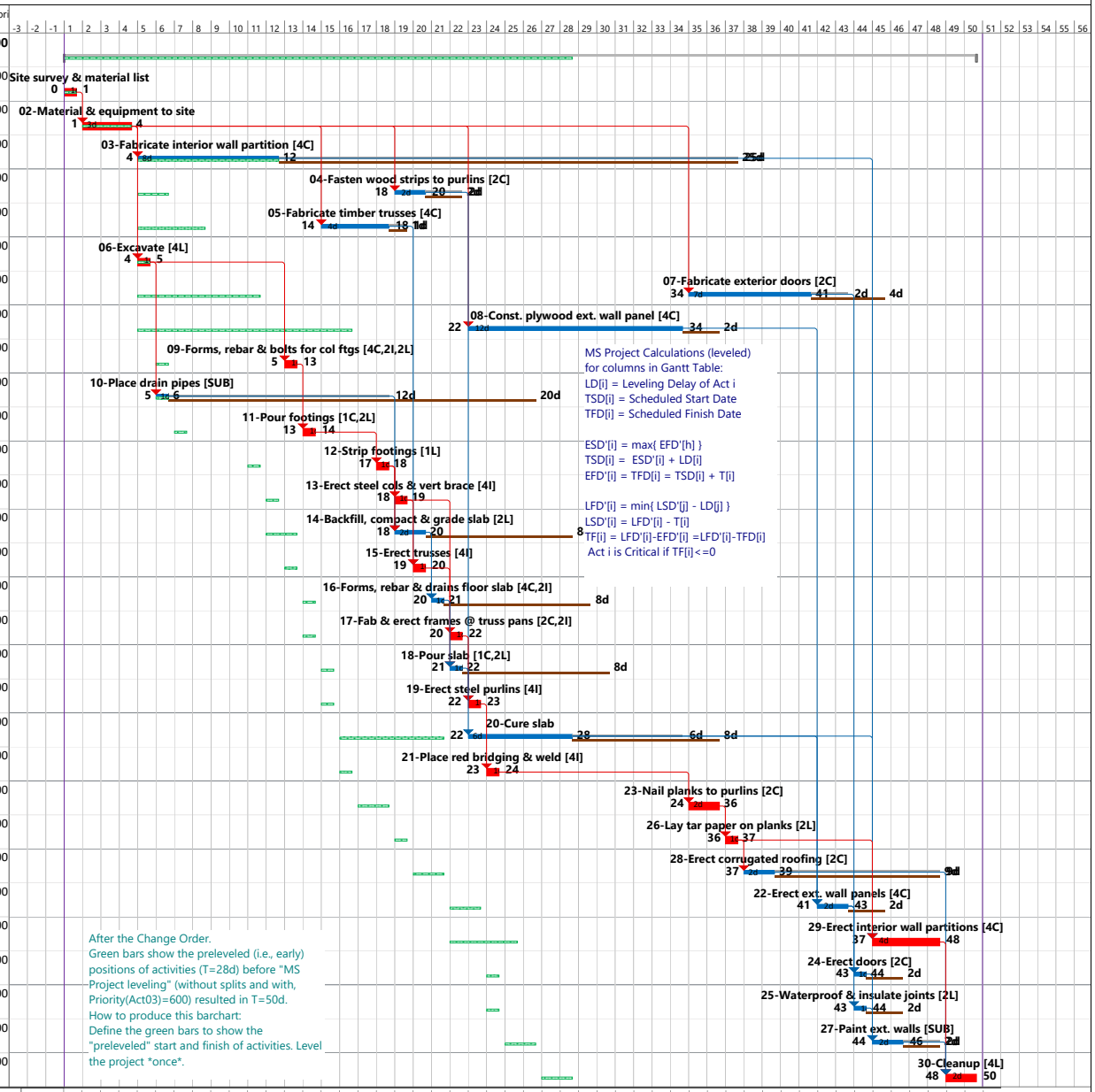
ID	Resource Name	Work	Details
	Unassigned	0d	Work
1	Carpenters	160d	Work
2	Ironworkers	22d	Work
3	Laborers	27d	Work

_Lab6.5_CO_Gantt_Chart_No_Splits-T=54
Sorted by: Preleveled Start, Name

After Change Order --- Leveled by MS Project (default, no splits) --- Project duration T=54d --- Link(11,12): FS LT=3d

Course: CEE538
User: P.G. Ioannou

ID	Act	Pred	T	Lev Del	ESD	TSD	LSD	EFD	TFD	LFD	FF	TF	Priori
0	**Warehouse Project**		**50d**	**0ed**	**0**	**0**	**0**	**0**	**0**	**0**	**0d**	**0d**	**900**
1	01-Site survey & material list		1d	0ed	0	0	0	1	1	1	0d	0d	500
2	02-Material & equipment to site	1	3d	0ed	1	1	1	4	4	4	0d	0d	500
3	03-Fabricate interior wall partition [4C]	2	8d	0ed	4	4	29	12	12	37	25d	25d	600
4	04-Fasten wood strips to purlins [2C]	2	2d	14ed	4	18	20	20	20	22	2d	2d	500
5	05-Fabricate timber trusses [4C]	2	4d	10ed	4	14	15	18	18	19	1d	1d	500
6	06-Excavate [4L]	2	1d	0ed	4	4	4	5	5	5	0d	0d	500
7	07-Fabricate exterior doors [2C]	2	7d	30ed	4	34	38	41	41	45	2d	4d	500
8	08-Const. plywood ext. wall panel [4C]	2	12d	18ed	4	22	24	34	34	36	0d	2d	500
9	09-Forms, rebar & bolts for col ftgs [4C,2I,2L]	6	1d	7ed	5	12	12	13	13	13	0d	0d	500
10	10-Place drain pipes [SUB]	6	1d	0ed	5	5	25	6	6	26	12d	20d	500
11	11-Pour footings [1C,2L]	9	1d	0ed	13	13	13	14	14	14	0d	0d	500
12	12-Strip footings [1L]	11FS+3d	1d	0ed	17	17	17	18	18	18	0d	0d	500
13	13-Erect steel cols & vert brace [4I]	12	1d	0ed	18	18	18	19	19	19	0d	0d	500
14	14-Backfill, compact & grade slab [2L]	10,12	2d	0ed	18	18	26	20	20	28	0d	8d	500
15	15-Erect trusses [4I]	13,5	1d	0ed	19	19	19	20	20	20	0d	0d	500
16	16-Forms, rebar & drains floor slab [4C,2I]	14	1d	0ed	20	20	28	21	21	29	0d	8d	500
17	17-Fab & erect frames @ truss pans [2C,2I]	15	1d	1ed	20	21	21	22	22	22	0d	0d	500
18	18-Pour slab [1C,2L]	13,16	1d	0ed	21	21	29	22	22	30	0d	8d	500
19	19-Erect steel purlins [4I]	4,17	1d	0ed	22	22	22	23	23	23	0d	0d	500
20	20-Cure slab	18	6d	0ed	22	22	30	28	28	36	6d	8d	500
21	21-Place red bridging & weld [4I]	19	1d	0ed	23	23	23	24	24	24	0d	0d	500
22	23-Nail planks to purlins [2C]	21	2d	10ed	24	34	34	36	36	36	0d	0d	500
23	26-Lay tar paper on planks [2L]	22	1d	0ed	36	36	36	37	37	37	0d	0d	500
24	28-Erect corrugated roofing [2C]	23	2d	0ed	37	37	46	39	39	48	9d	9d	500
25	22-Erect ext. wall panels [4C]	20,8	2d	7ed	34	41	43	43	43	45	0d	2d	500
26	29-Erect interior wall partitions [4C]	3,20,23	4d	7ed	37	44	44	48	48	48	0d	0d	500
27	24-Erect doors [2C]	7,25	1d	0ed	43	43	45	44	44	46	0d	2d	500
28	25-Waterproof & insulate joints [2L]	25	1d	0ed	43	43	45	44	44	46	0d	2d	500
29	27-Paint ext. walls [SUB]	27,28	2d	0ed	44	44	46	46	46	48	2d	2d	500
30	30-Cleanup [4L]	29,24,26	2d	0ed	48	48	48	50	50	50	0d	0d	500

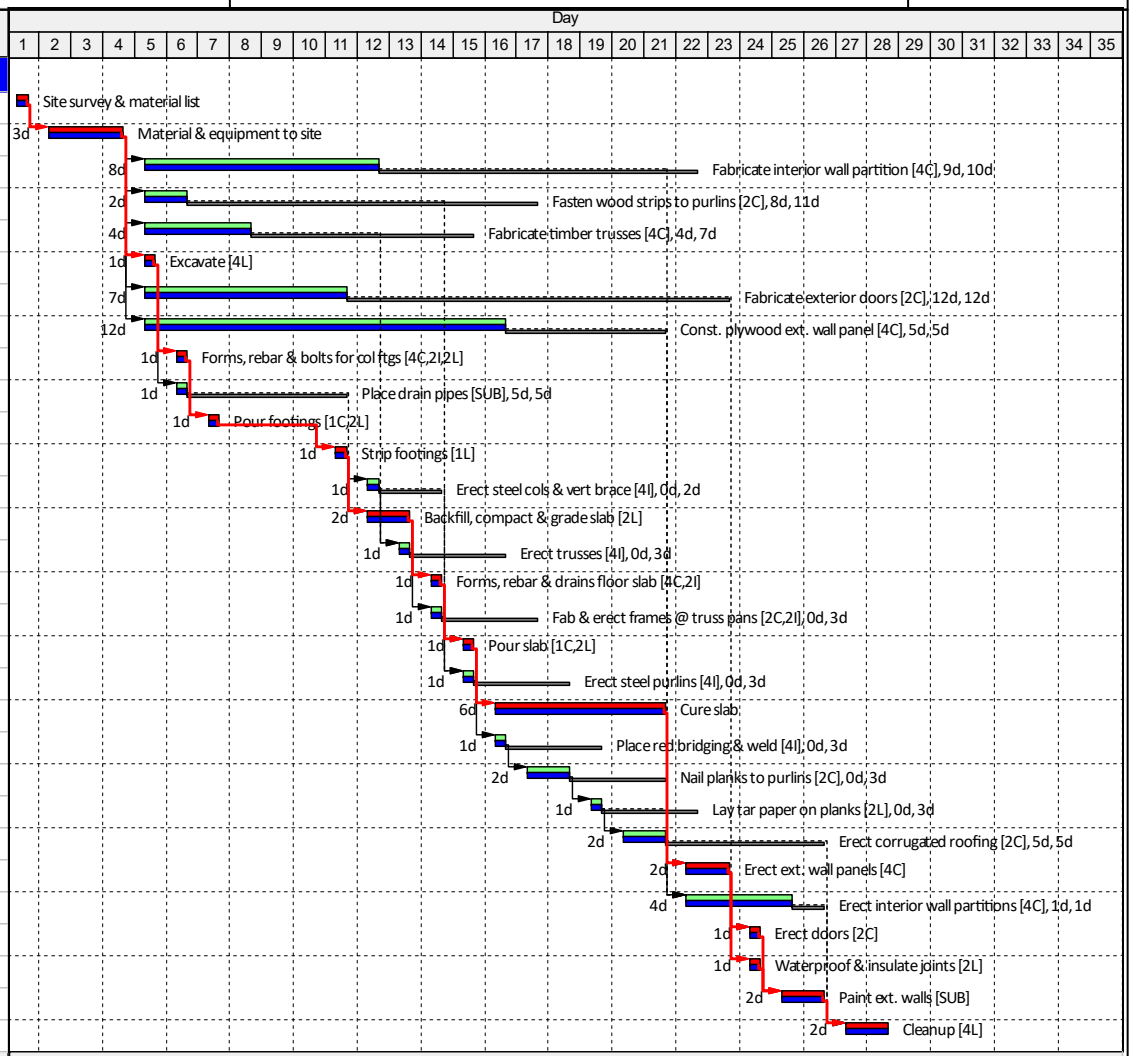


ID	Resource Name	Work	Details
	Unassigned	0d	Work
1	Carpenters	160d	Work
2	Ironworkers	22d	Work
3	Laborers	27d	Work

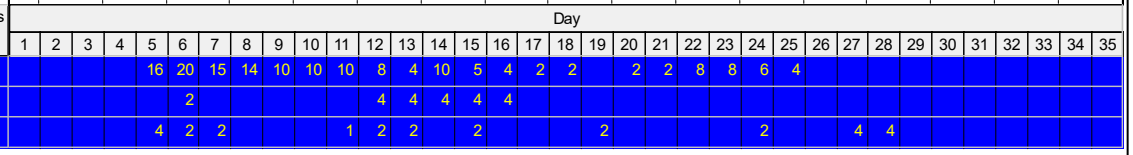
Note: The Resource Usage spreadsheet, shown on the right, was printed to pdf separately and was pasted to the pdf for the Gantt Chart using "Bluebeam Revu". If you find this too difficult, you can print and submit the two reports separately.

Primavera P6 Professional	Project: WH-LT-After CO-Unleveled-T=28d	Layout: 2025F-Lab6.4-CO-Unleveled	Date: 25-07-25

ID	Act	Pred	Orig Dur	Start	Finish	FF	TF
WH-LT-After CO-Unleveled-T=28d			28d	01-11-25	28-11-25	0d	0d
01	Site survey & material list		1d	01-11-25	01-11-25	0d	0d
02	Material & equipment to site	01	3d	02-11-25	04-11-25	0d	0d
03	Fabricate interior wall partition [4C]	02	8d	05-11-25	12-11-25	9d	10d
04	Fasten wood strips to purlins [2C]	02	2d	05-11-25	06-11-25	8d	11d
05	Fabricate timber trusses [4C]	02	4d	05-11-25	08-11-25	4d	7d
06	Excavate [4L]	02	1d	05-11-25	05-11-25	0d	0d
07	Fabricate exterior doors [2C]	02	7d	05-11-25	11-11-25	12d	12d
08	Const. plywood ext. wall panel [4C]	02	12d	05-11-25	16-11-25	5d	5d
09	Forms, rebar & bolts for col ftgs [4C,2I,2L]	06	1d	06-11-25	06-11-25	0d	0d
10	Place drain pipes [SUB]	06	1d	06-11-25	06-11-25	5d	5d
11	Pour footings [1C,2L]	09	1d	07-11-25	07-11-25	0d	0d
12	Strip footings [1L]	11	1d	11-11-25	11-11-25	0d	0d
13	Erect steel cols & vert brace [4I]	12	1d	12-11-25	12-11-25	0d	2d
14	Backfill, compact & grade slab [2L]	10, 12	2d	12-11-25	13-11-25	0d	0d
15	Erect trusses [4I]	13, 05	1d	13-11-25	13-11-25	0d	3d
16	Forms, rebar & drains floor slab [4C,2I]	14	1d	14-11-25	14-11-25	0d	0d
17	Fab & erect frames @ truss pans [2C,2I]	15	1d	14-11-25	14-11-25	0d	3d
18	Pour slab [1C,2L]	13, 16	1d	15-11-25	15-11-25	0d	0d
19	Erect steel purlins [4I]	04, 17	1d	15-11-25	15-11-25	0d	3d
20	Cure slab	18	6d	16-11-25	21-11-25	0d	0d
21	Place red bridging & weld [4I]	19	1d	16-11-25	16-11-25	0d	3d
23	Nail planks to purlins [2C]	21	2d	17-11-25	18-11-25	0d	3d
26	Lay tar paper on planks [2L]	23	1d	19-11-25	19-11-25	0d	3d
28	Erect corrugated roofing [2C]	26	2d	20-11-25	21-11-25	5d	5d
22	Erect ext. wall panels [4C]	20, 08	2d	22-11-25	23-11-25	0d	0d
29	Erect interior wall partitions [4C]	03, 20, 26	4d	22-11-25	25-11-25	1d	1d
24	Erect doors [2C]	07, 22	1d	24-11-25	24-11-25	0d	0d
25	Waterproof & insulate joints [2L]	22	1d	24-11-25	24-11-25	0d	0d
27	Paint ext. walls [SUB]	24, 25	2d	25-11-25	26-11-25	0d	0d
30	Cleanup [4L]	27, 28, 29	2d	27-11-25	28-11-25	0d	0d



Activity ID		Remaining Units	Remaining Units
Carpenters		160	
Ironworkers		22	
Laborers		27	



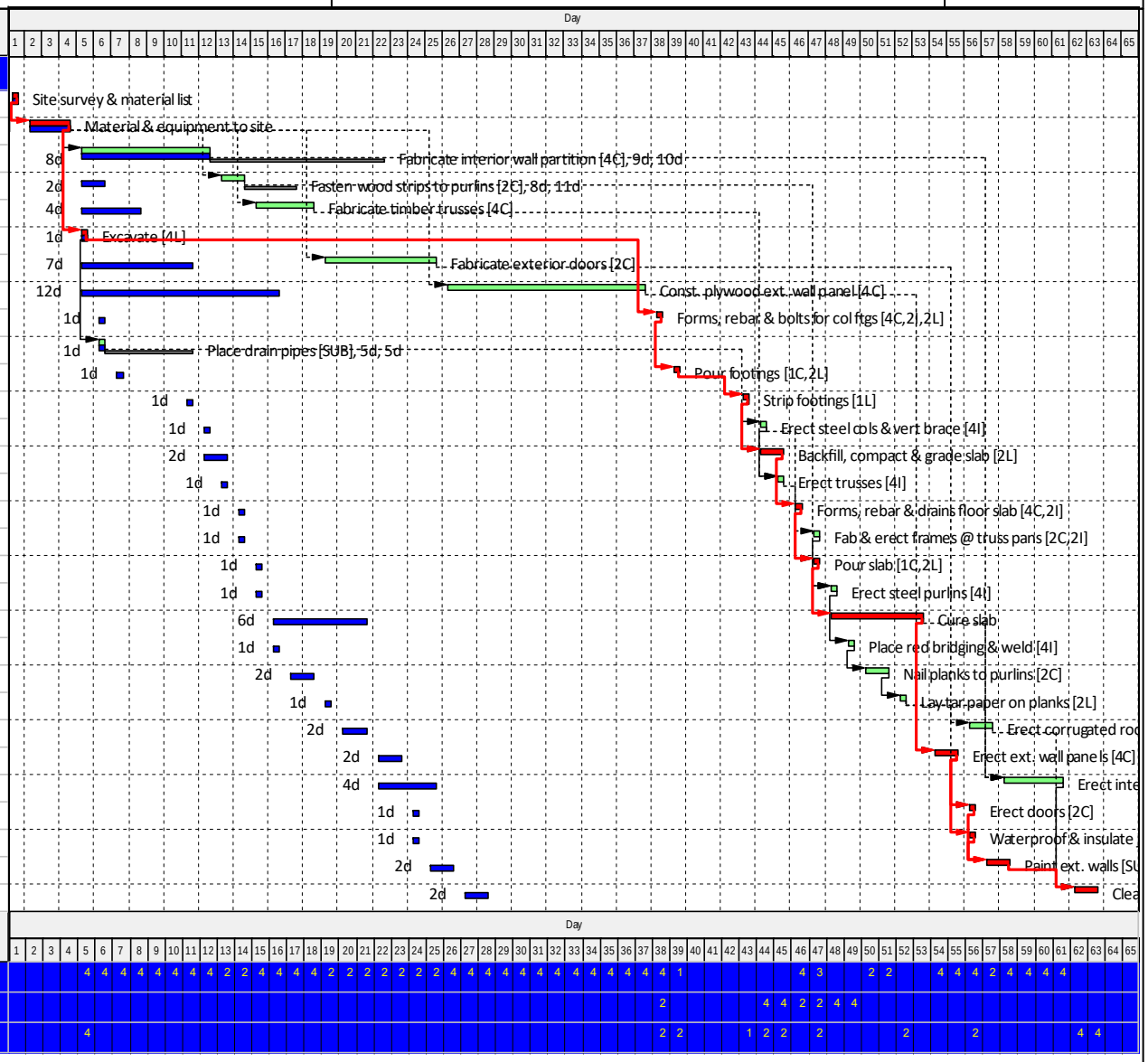
Critical Rem Work
Float Bar
Remaining Work
Early Bar

Date	Revision	Check...	Approved
01-11-25	After Change Order - Early-Start Schedule, Unleveled, T=28d	PGI	PGI
	(To print all 3 res rows in sprdsht, select them on screen)		
	Sorted by: Early Start, Activity ID, Link(11,12):FS LT = 3d		

Course: CEE538
User: P.G. Ioannou

Primavera P6 Professional	Project: WH-LT-After CO-No Splits-Def Lvl-T=63d	Layout: 2025F-Lab6.5-CO-Default_Leveling	Date: 25-07-25

ID	Act	Pred	Orig Dur	FF	TF
WH-LT-After CO-No Splits-Def Lvl-T=63d			63d	0d	0d
01	Site survey & material list		1d	0d	0d
02	Material & equipment to site	01	3d	0d	0d
03	Fabricate interior wall partition [4C]	02	8d	9d	10d
04	Fasten wood strips to purlins [2C]	02	2d	8d	11d
05	Fabricate timber trusses [4C]	02	4d	4d	7d
06	Excavate [4L]	02	1d	0d	0d
07	Fabricate exterior doors [2C]	02	7d	12d	12d
08	Const. plywood ext. wall panel [4C]	02	12d	5d	5d
09	Forms, rebar & bolts for col ftgs [4C,2I,2L]	06	1d	0d	0d
10	Place drain pipes [SUB]	06	1d	5d	5d
11	Pour footings [1C,2L]	09	1d	0d	0d
12	Strip footings [1L]	11	1d	0d	0d
13	Erect steel cols & vert brace [4I]	12	1d	0d	2d
14	Backfill, compact & grade slab [2L]	10, 12	2d	0d	0d
15	Erect trusses [4I]	13, 05	1d	0d	3d
16	Forms, rebar & drains floor slab [4C,2I]	14	1d	0d	0d
17	Fab & erect frames @ truss pans [2C,2I]	15	1d	0d	3d
18	Pour slab [1C,2L]	13, 16	1d	0d	0d
19	Erect steel purlins [4I]	04, 17	1d	0d	3d
20	Cure slab	18	6d	0d	0d
21	Place red bridging & weld [4I]	19	1d	0d	3d
23	Nail planks to purlins [2C]	21	2d	0d	3d
26	Lay tar paper on planks [2L]	23	1d	0d	3d
28	Erect corrugated roofing [2C]	26	2d	5d	5d
22	Erect ext. wall panels [4C]	20, 08	2d	0d	0d
29	Erect interior wall partitions [4C]	03, 20, 26	4d	1d	1d
24	Erect doors [2C]	07, 22	1d	0d	0d
25	Waterproof & insulate joints [2L]	22	1d	0d	0d
27	Paint ext. walls [SUB]	24, 25	2d	0d	0d
30	Cleanup [4L]	27, 28, 29	2d	0d	0d



Activity ID		Remaining Units	Budgeted Units
Carpenters		160	
Ironworkers		22	
Laborers		27	

Critical Rem Work
Float Bar
Remaining Work
Early Bar

Date	Revision	Check...	Approved
01-11-25	After Change Order - Default leveling, T=63d	PGI	PGI
	(To print all 3 res rows in sprdsht, select them on screen)		
	Sorted by: Early Start, Activity ID; Link(11,12): FS LT=3d		

Course: CEE538
User: P.G. Ioannou

Primavera P6 Professional	Project: WH-LT-After CO-No Splits-TF Lvl-T=50d	Layout: 2025F-Lab6.6-CO-TF_Leveling	Date: 25-07-25

ID	Act	Pred	Orig Dur	FF	TF
WH-LT-After CO-No Splits-TF Lvl-T=50d			50d	0d	0d
01	Site survey & material list		1d	0d	-12d
02	Material & equipment to site	01	3d	0d	-12d
03	Fabricate interior wall partition [4C]	02	8d	2d	-19d
04	Fasten wood strips to purlins [2C]	02	2d	3d	5d
05	Fabricate timber trusses [4C]	02	4d	1d	5d
06	Excavate [4L]	02	1d	0d	-1d
07	Fabricate exterior doors [2C]	02	7d	10d	13d
08	Const. plywood ext. wall panel [4C]	02	12d	16d	-12d
09	Forms, rebar & bolts for col ftgs [4C,2I,2L]	06	1d	0d	-12d
10	Place drain pipes [SUB]	06	1d	16d	4d
11	Pour footings [1C,2L]	09	1d	0d	-12d
12	Strip footings [1L]	11	1d	0d	-12d
13	Erect steel cols & vert brace [4I]	12	1d	0d	-9d
14	Backfill, compact & grade slab [2L]	10, 12	2d	0d	-12d
15	Erect trusses [4I]	13, 05	1d	2d	4d
16	Forms, rebar & drains floor slab [4C,2I]	14	1d	0d	-12d
17	Fab & erect frames @ truss pans [2C,2I]	15	1d	0d	2d
18	Pour slab [1C,2L]	13, 16	1d	0d	-11d
19	Erect steel purlins [4I]	04, 17	1d	0d	2d
20	Cure slab	18	6d	0d	-3d
21	Place red bridging & weld [4I]	19	1d	0d	2d
23	Nail planks to purlins [2C]	21	2d	0d	2d
26	Lay tar paper on planks [2L]	23	1d	10d	2d
28	Erect corrugated roofing [2C]	26	2d	4d	4d
22	Erect ext. wall panels [4C]	20, 08	2d	0d	-3d
29	Erect interior wall partitions [4C]	03, 20, 26	4d	0d	-10d
24	Erect doors [2C]	07, 22	1d	0d	3d
25	Waterproof & insulate joints [2L]	22	1d	8d	11d
27	Paint ext. walls [SUB]	24, 25	2d	3d	3d
30	Cleanup [4L]	27, 28, 29	2d	0d	0d

Resource Name	Remaining Units	Budgeted Units
Carpenters	160	
Ironworkers	22	
Laborers	27	

Project Baseline Bar
Float Bar
Critical Rem Work
Remaining Work

Date	Revision	Check...	Approved
01-11-25	After Change Order - Repeated TF leveling, T=50d	PGI	PGI
	(To print all 3 res rows in sprdsht, select them on screen)		
	Sorted by: BLEarlyStart, Activity ID; Link(11,12): FS LT=3d		

Course: CEE538
User: P.G. Ioannou