



مدیریت مالی، حسابداری و هزینه در پروژه ها و سازمان های پروژه محور

بخش نهم:

مدیریت هزینه: مدیریت هزینه پروژه

ارائه دهنده:

سید محمدرضا علوی پور

(PhD, PMP, CMIT)

What you will learn?

- ☐ Purpose of this session
- ☐ Roadmap
- ☐ Why cost control is important?
- ☐ What are the purposes of cost control?
- ☐ How the costs of a project are controlled?
- ☐ Importance of cost code
- ☐ Monitoring and controlling material, labor, subcontracts, and equipment costs
- ☐ Monitoring and controlling project overhead and general overhead costs
- ☐ Monitoring project profitability
- ☐ How to manage the sources of cost overrun
- ☐ Cost-loaded schedule
- ☐ Earned value management system (EVMS)
- ☐ Target levels for cost performance index (CPI)
- ☐ Target levels for schedule performance index (SPI)
- ☐ Project closeout audit



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**Subcontractor Construction
Purchase Order Form**
Construction Projects up to \$50,000 for MPCA Contracts
Section 3

MPCA Contractor and Subcontracting
Purchasing Manual

Material purchases

- ❑ Small purchase orders for stopgap materials **may** be processed without costs **but** should include the **quantity** of the items needed.
 - ❖ This is often **necessary** to keep the **job moving**.
 - ❖ Stopgap? Unplanned, often temporary, measures taken to **fix an unexpected problem**.
 - ❖ **On every job**, some **stopgap** purchase orders are **needed**;
 - ✓ However, a **persistent pattern** of stopgap purchase orders is a **sign of inadequate planning**, which is a major **enemy to good cost controls**.

Material purchases

Remember this?

Committed Cost Worksheet

	A	B	C	D	E	F	G	H	I	J	K	L
1									Total		Total	
2									Committed		Estimated	
3								Non-	and Non-	Estimated	Cost	Variance
4					Total		Committed	Committed	Committed	Cost	at	Over /
5			Original	Change	Estimate	Committed	Costs	Costs	Costs	To	Completion	(Under)
6	Code	Description	Estimate	Orders	(C + D)	Costs	Invoiced	Invoiced	(F + H)	Complete	(I + J)	(K - E)
7					—				—		—	—
8					—				—		—	—
9			—	—	—	—	—	—	—	—	—	—

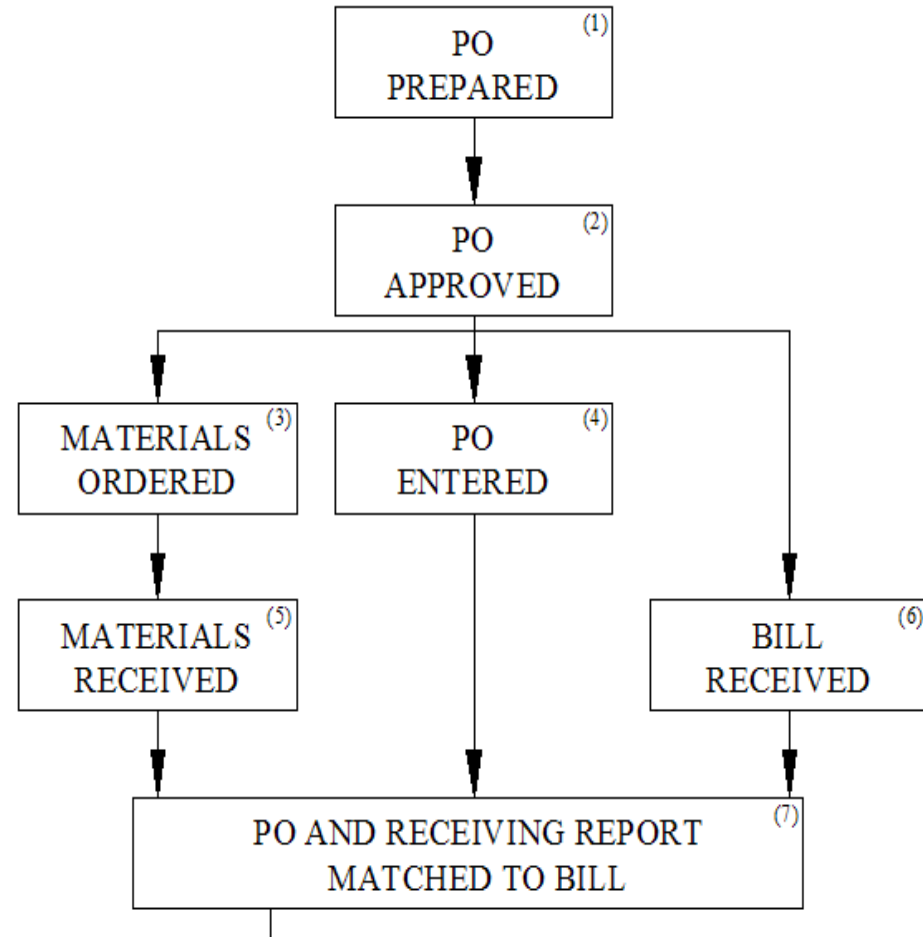
Material purchases

- ❑ **STEP 1:** A **purchase order** is prepared for the **materials needed** and should include:

1. **Quantity** of materials,
2. **Type** of materials,
3. Materials **costs**, and
4. **Date** the materials are **needed**
5. **Date** the PO is prepared

- ❑ This **may be done** by

1. **Field personnel**,
2. **Estimator** at the time of **buyout**, or
3. **Project manager**



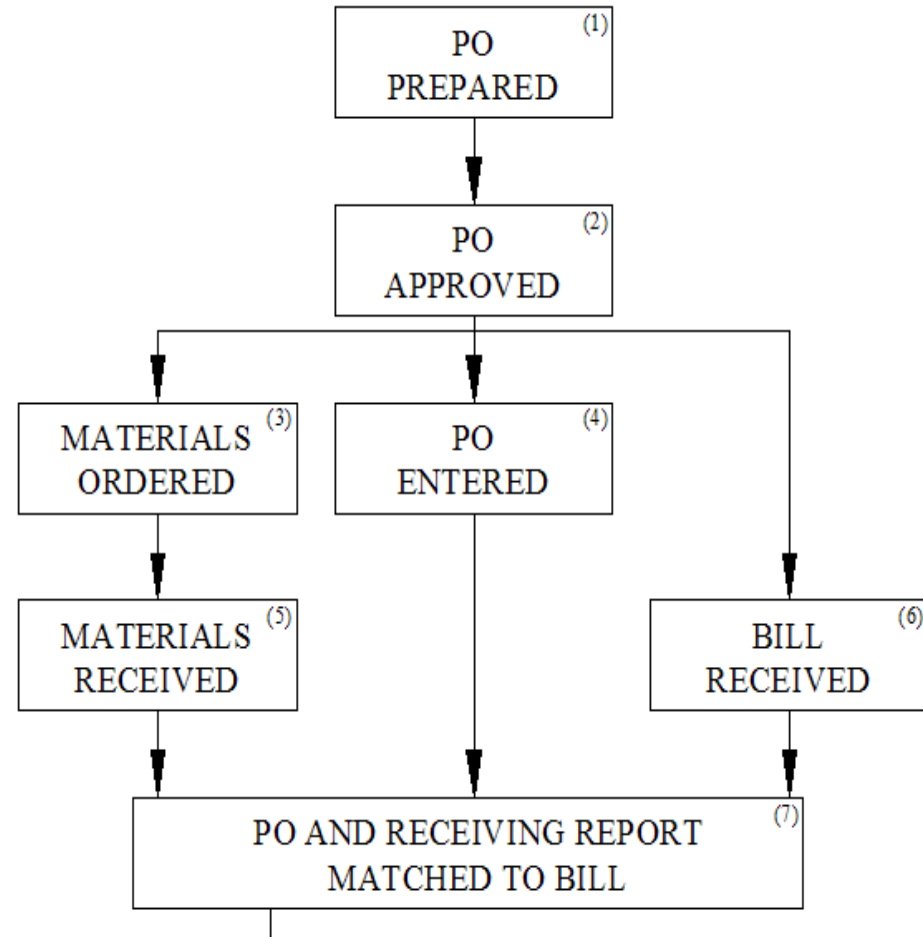
Material purchases

❑ **STEP 2: PO** checked against the **budget** and **approved** or **denied** by the **project manager** or, if **allowed**, by the **superintendent**.

❖ Project manager and the superintendent **can seek other sources** for the materials **if** the PO **exceeds** the **budget** amount **before** the materials have been **ordered**.

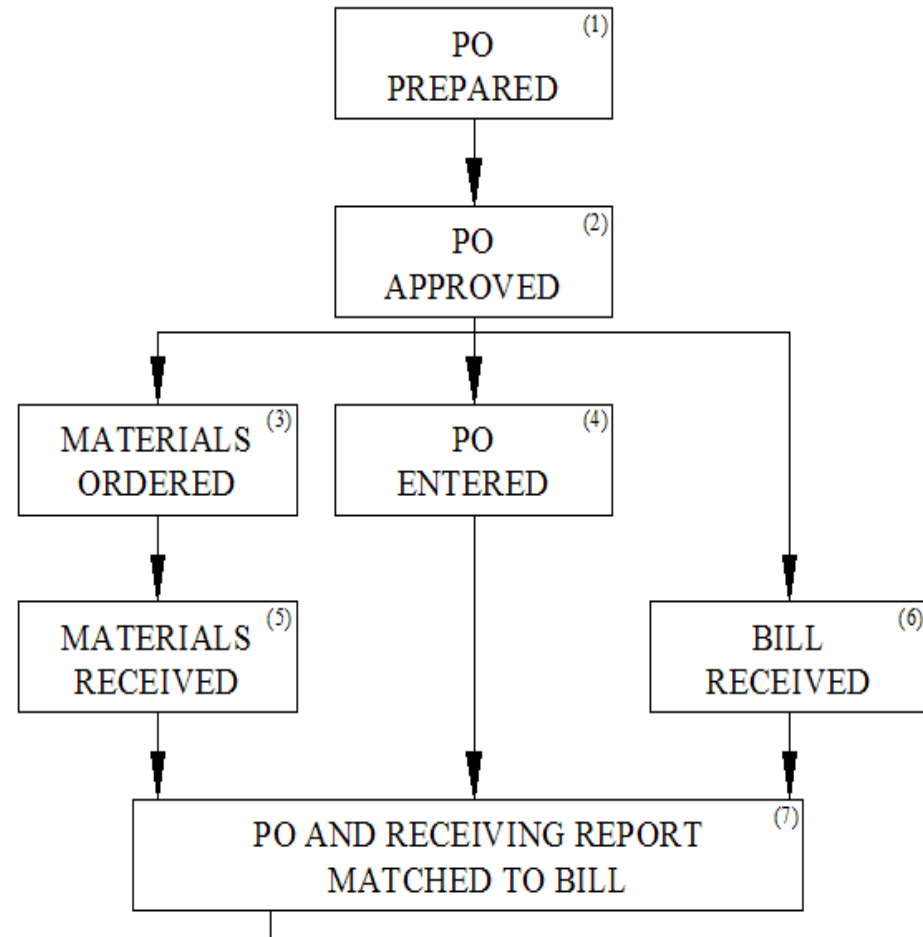
❖ To check the **PO** against the **budget**, the **total committed** and **noncommitted costs** to date **must** be available.

At the time the **PO** is **approved**, the materials are **coded** to a **job cost code**.



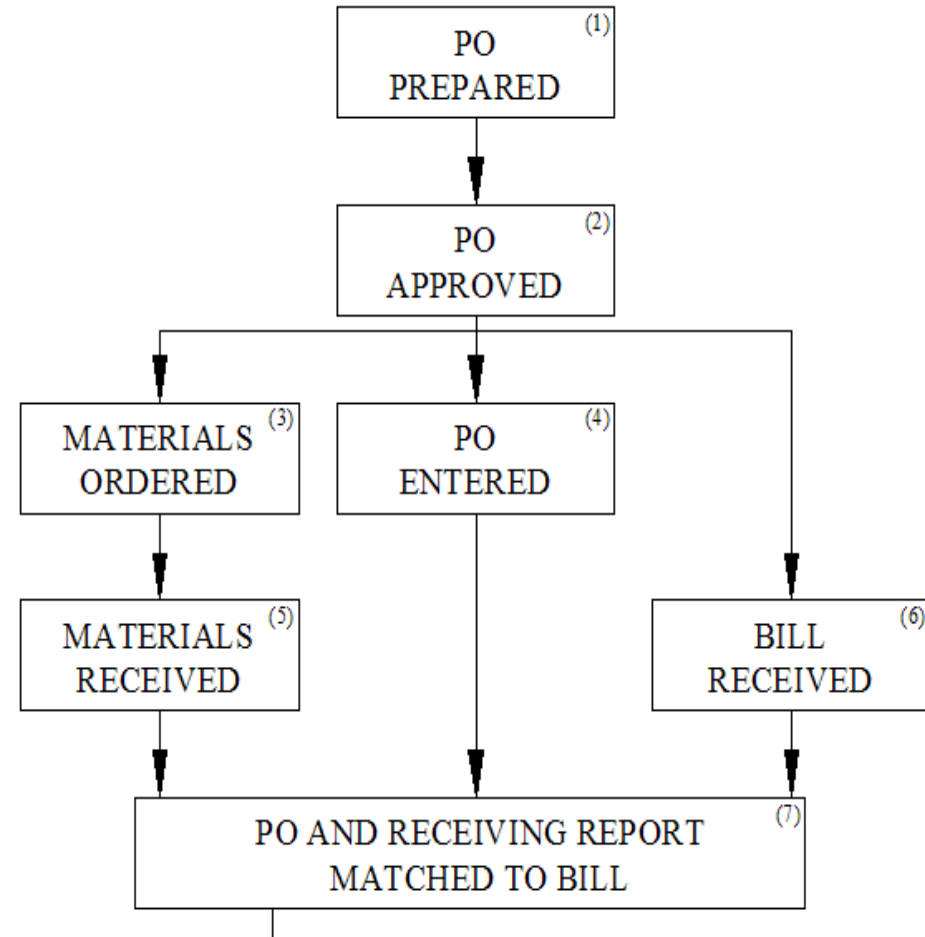
Material purchases

- ❑ **STEP 3:** **After** the purchase order has been **approved**, the materials may be ordered by the party **requesting** the purchase.



Material purchases

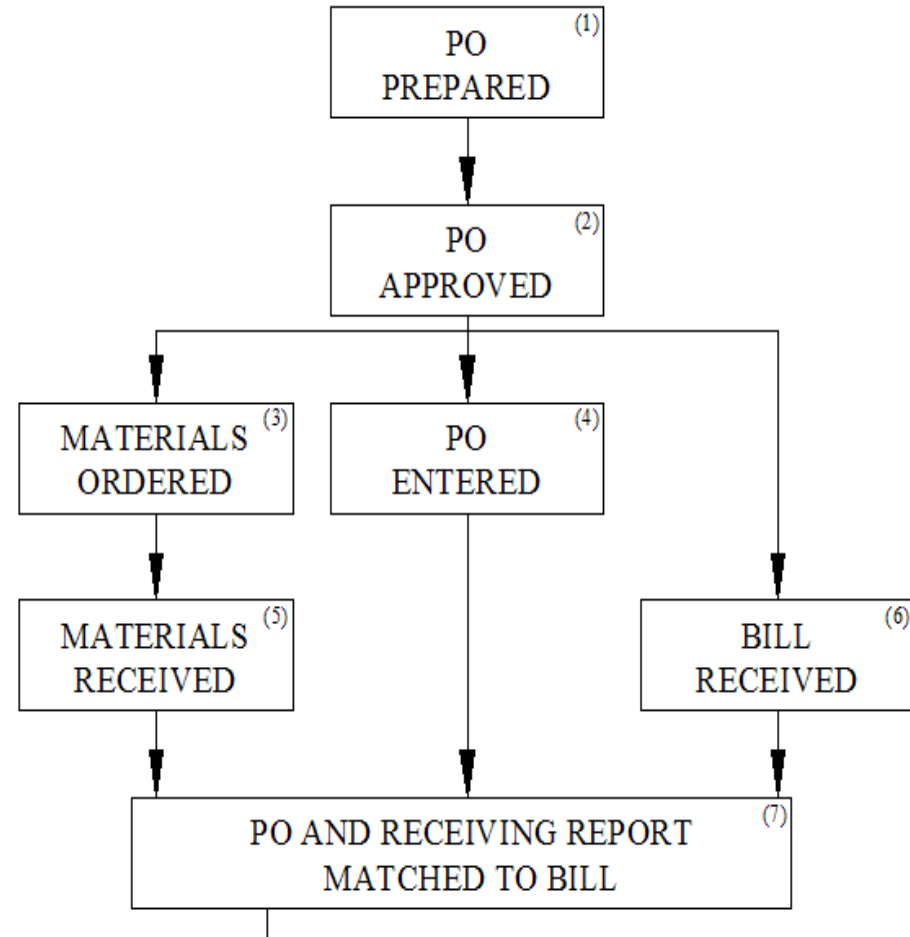
- ❑ **STEP 4:** The **purchase order** is entered into the **accounting system** as a **committed cost** by the **accounting department**.



Material purchases

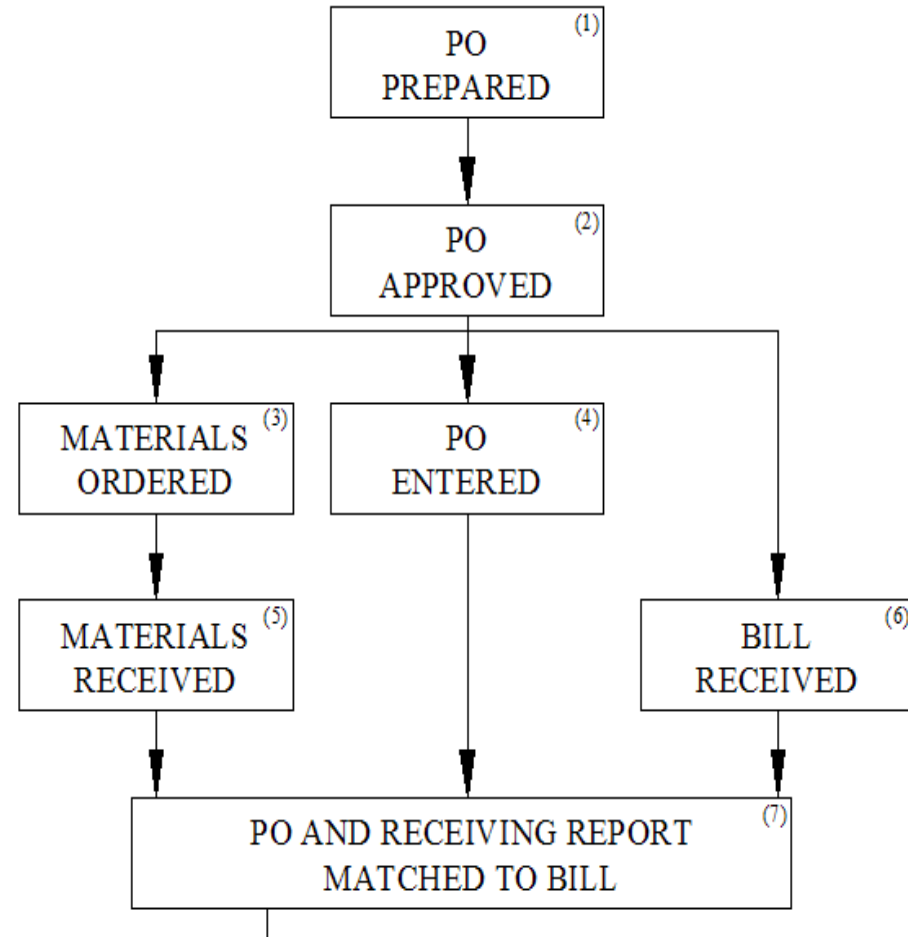
❑ **STEP 5:** When the materials are **received**, the **project manager** should notify the **accounting department** that the materials have been received.

- ❖ This **notice of receipt** should include listing any **missing** or **damaged** materials.
- ❖ This notice is often done by sending a **copy of the shipping invoice** to the accounting department.



Material purchases

- ❑ **STEP 6:** After the **bill** is received, it is entered into the **accounting system**.

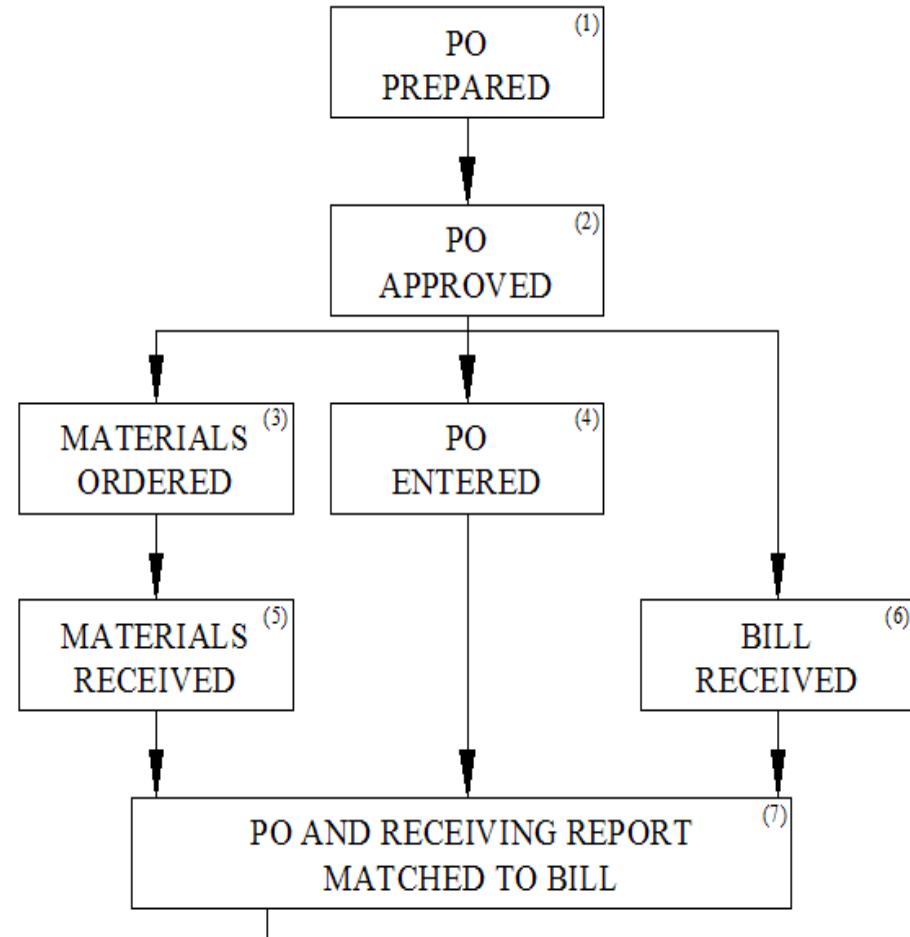


Material purchases

❑ **STEP 7:** The **bill** is then matched to

1. Notice of receipt and
2. Purchase order

by the **accounting department**.



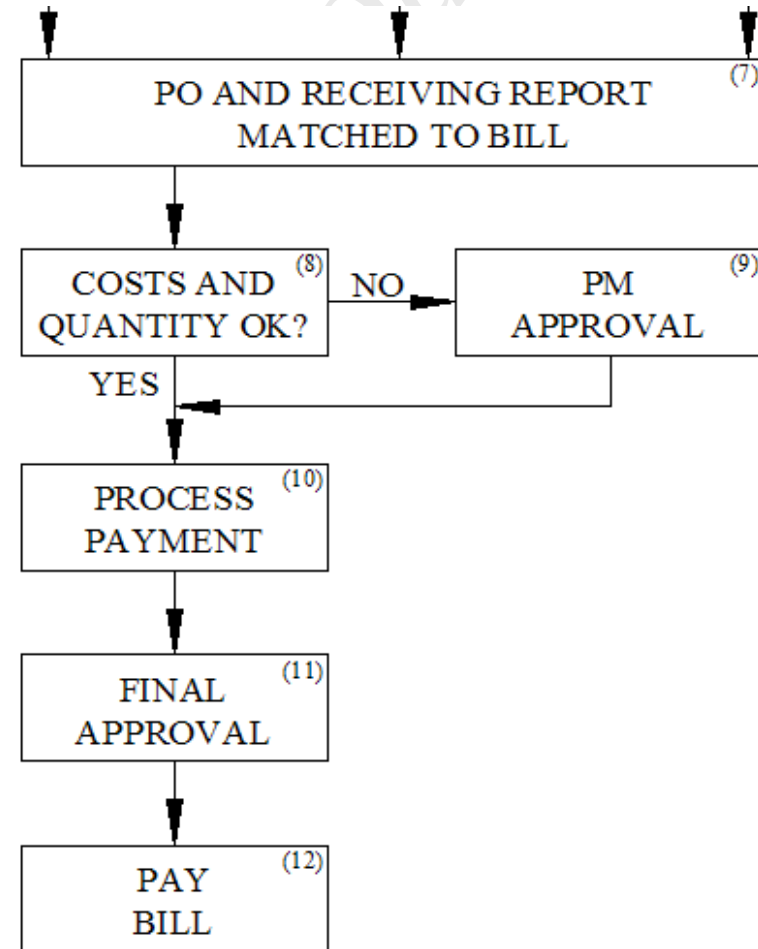
Material purchases

❑ **STEP 8:** The quantities and prices on the **bill**

are compared to

1. **Notice of receipt** and
2. **Purchase order**

by the **accounting department**.

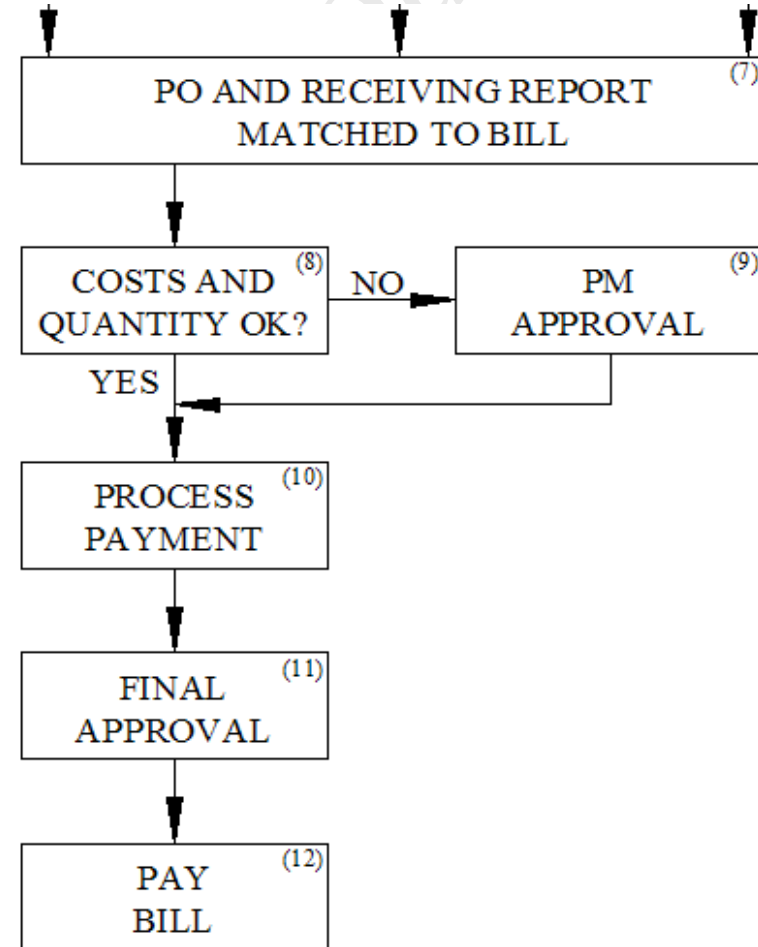


Material purchases

❑ STEP 9:

1. If the material **quantities** or **costs** on the bill **exceed** the amounts on the **PO** or **notice of receipt**, or
2. If the **PO** lacks costs,

(1) a copy of the bill, the (2) notice of receipt, and the (3) PO are sent to the project manager for approval.

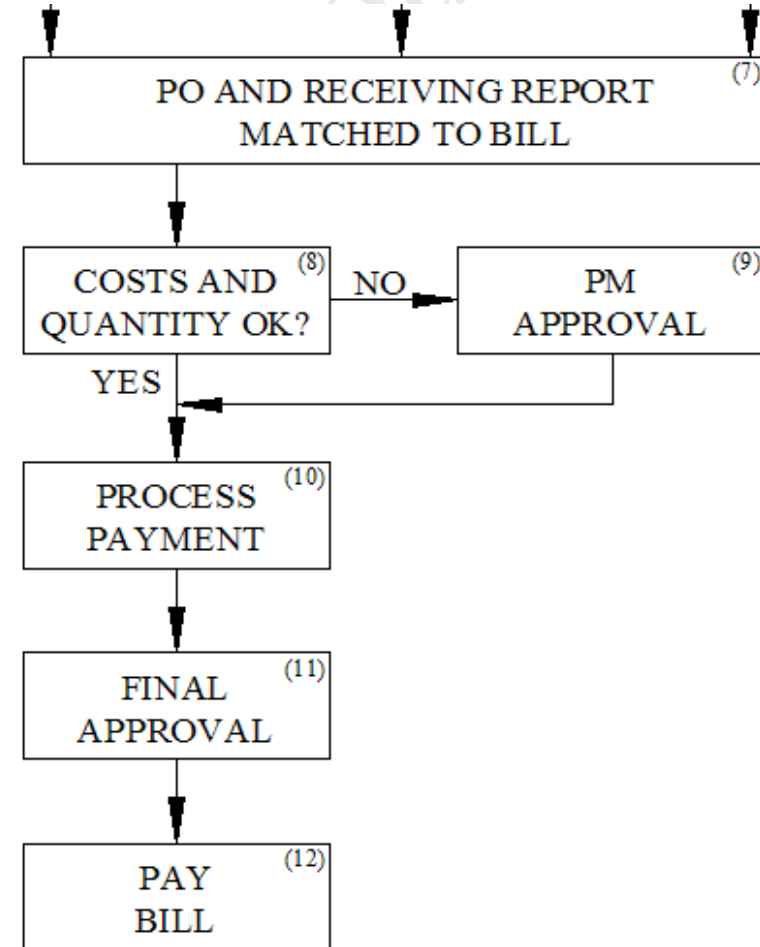


Material purchases

3. If the material **quantities** on the bill are **less** than the **amounts** on the **PO** and there are **additional deliveries expected**,

❖ The **quantities received** are **noted on the PO** so that they **may** be **added** to **future deliveries**.

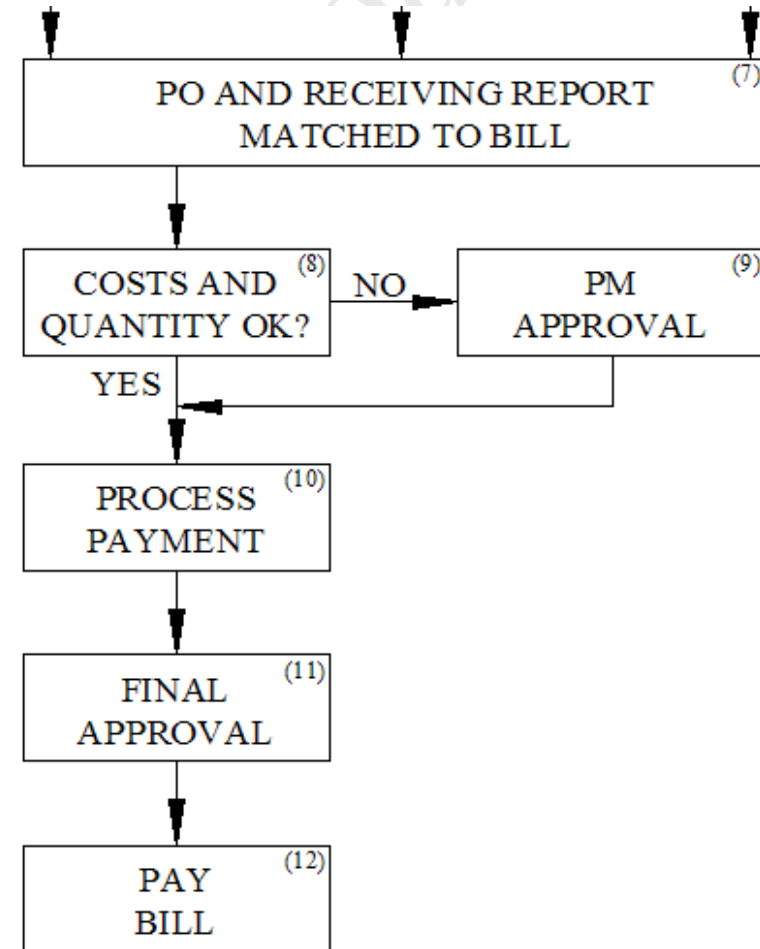
- ✓ This is a **common occurrence** when ordering **large quantities** of material that **cannot** be delivered in a **single shipment**.
- ✓ The **accounting system** should allow for **receipt** and **payment** of **partial shipments**.



Material purchases

❑ STEP 10: **All bills** that do not exceed the **quantities** or **costs** on the **purchase order** or **notice of receipt**

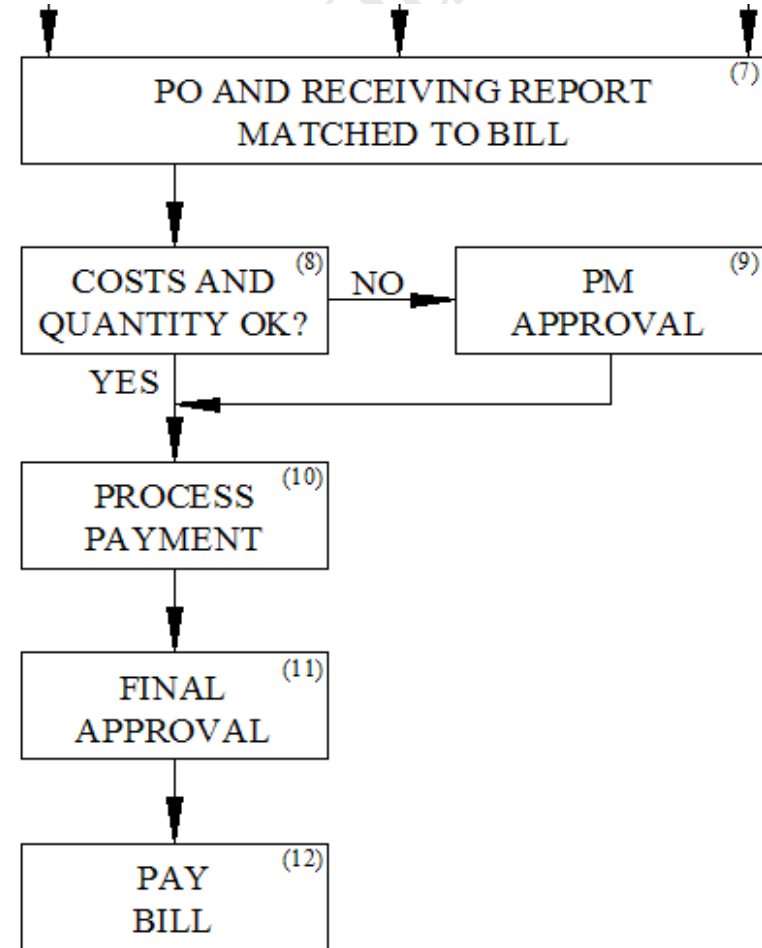
do not need approval of the **project manager** and
are **processed for payment**.



Material purchases

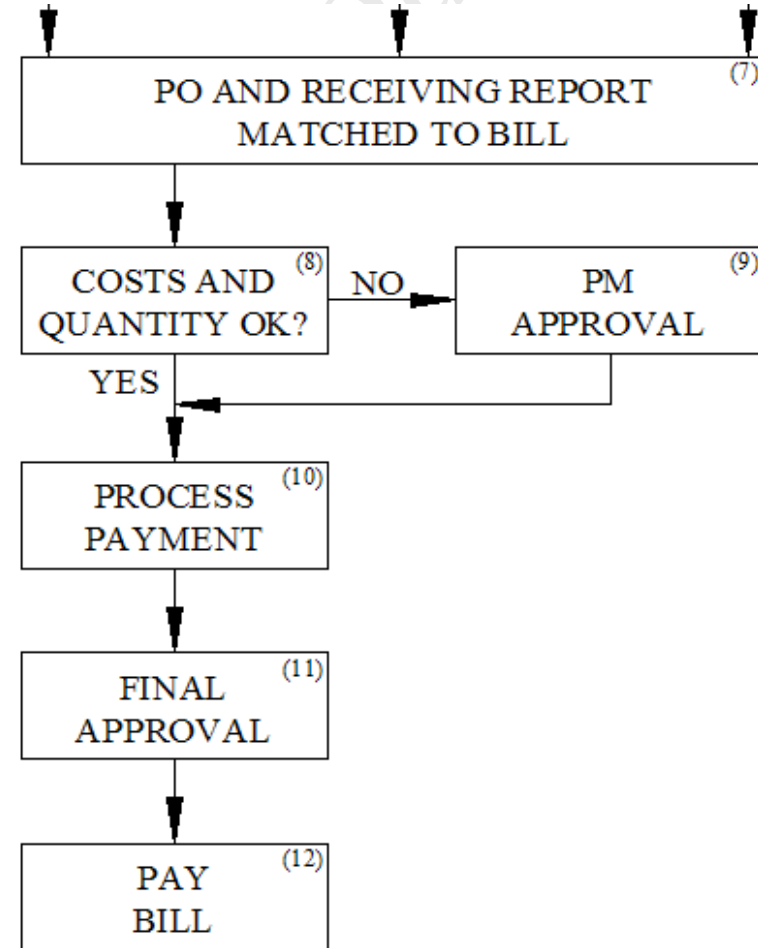
- ❑ **STEP 11: Prior to payment** of the **bill**, the accounting department should send a **list of suppliers** to the project manager for **final approval**.

❖ This gives the **project manager** **one last chance** to **withhold payment** in the event there were **problems** with the materials supplied.



Material purchases

- ❑ **STEP 12:** Once **final approval** is received, the accounting department **may** pay the bill.

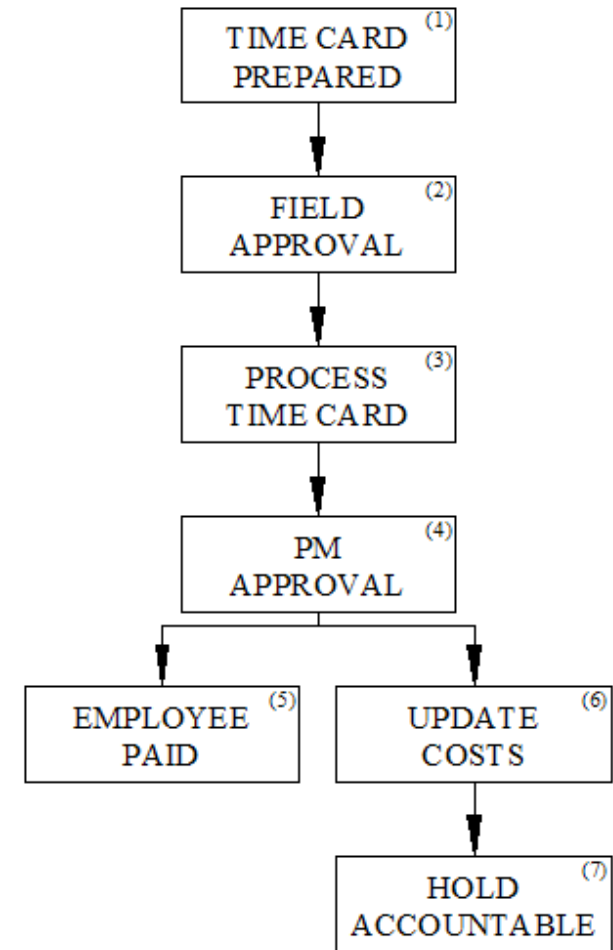


- ❑ Labor is **much more difficult** to control than **materials**.
- ❑ With **labor**, the costs are **not available** to the project manager until the work has been **performed** and the **employees' time** has been **entered into the accounting system**, which may occur a **month** or **more after** the **work** has been **performed**.
- ❑ A key to controlling labor cost is for the project manager to hold the superintendent and crew forepersons **responsible** for the **productivity** and **costs** of their crew.

❑ **STEP 1:** The employees are **tracked** on a **time card**.

❖ The time should be **separated** by the **type of work** being performed and should be **consistent** with the

1. **Company's cost coding system** and
2. **Budget** for the project.

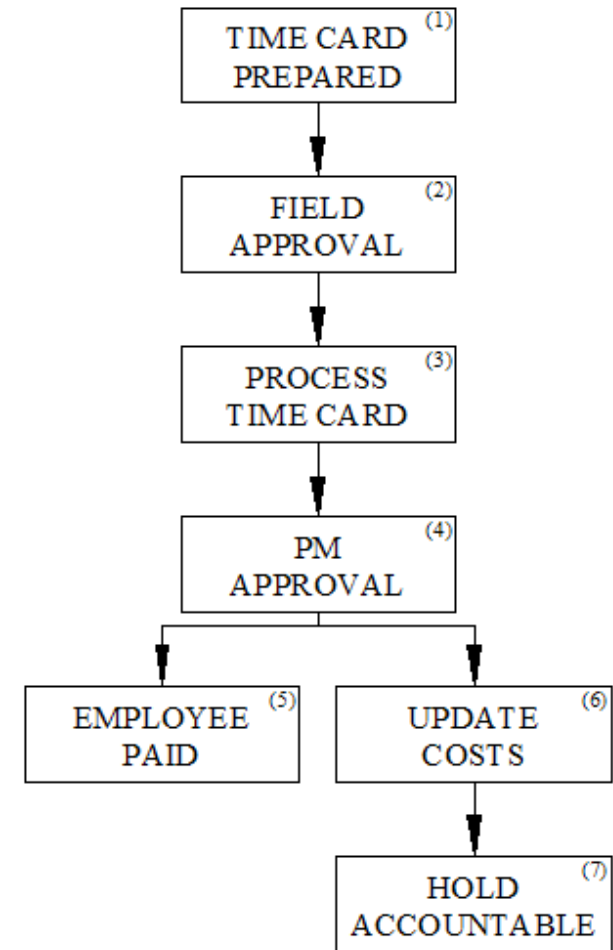


❑ STEP 2: The **foreperson** and **superintendent**

1. Check and approve the **time card**
2. Verifying the **hours** worked
3. Verifying the **cost codes**.

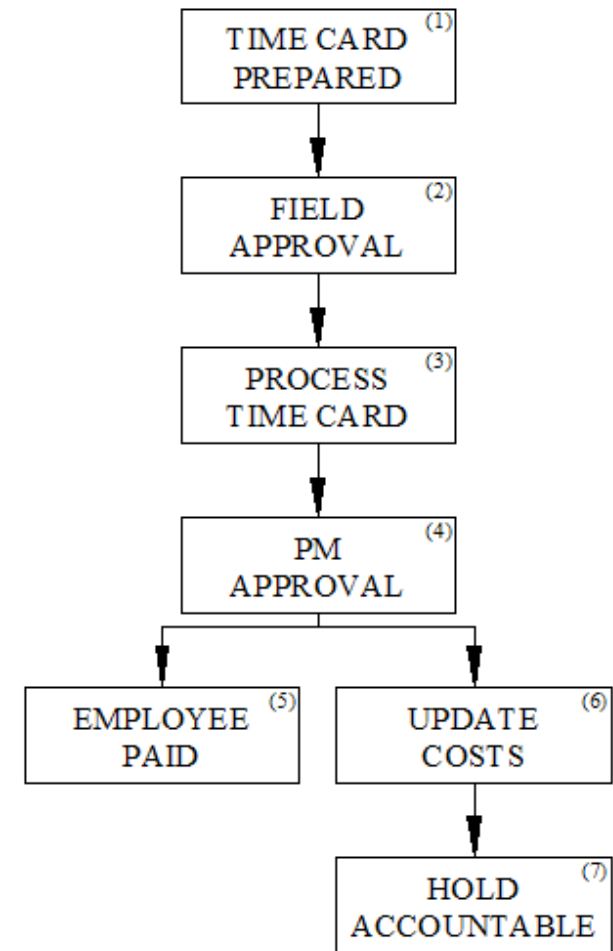
❖ The **superintendent** should make sure that the work has been coded to the **correct job cost code**.

❖ The **superintendent** will have **better control** of the labor costs **if** he or she **reviews** the **labor hours daily**.



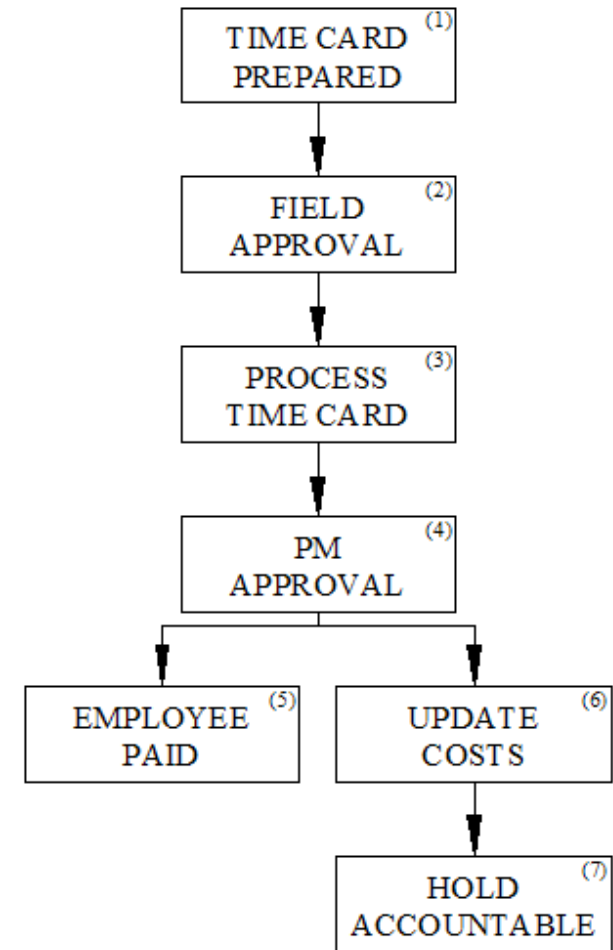
- ❑ **STEP 3:** Once the time cards have been **approved**, the superintendent **sends** the time cards to the **accounting department**,

Then, the **time** is entered into the **accounting system**.



❑ **STEP 4:** The **number of hours** worked, along with the **costs**, are then sent to the **project manager** for approval.

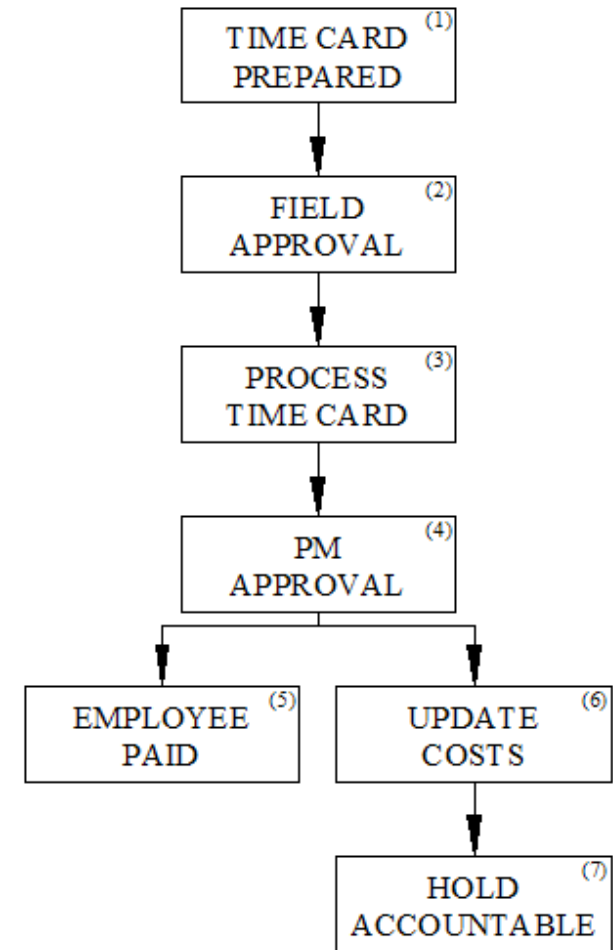
❑ **STEP 5:** **Payroll checks** are processed.



❑ **STEP 6:** With the new costs entered into the accounting system, the **project manager** may **update**

1. **Cost to complete**
2. **Total estimated cost at completion**

Remember committed cost?



❑ **Noncommitted costs** typically include:

1. **Change orders** to the SCs (Added to both **Column D and H**)
2. **In-house costs** for GC (Added to **Column H**)
3. **Contracts with SCs** with **unknown costs** and based on invoices (Added to **Column H**)

❑ If noncommitted costs have **not been invoiced yet**

❖ **Not included** in the **non-committed costs invoiced**

But

❖ Included in **estimated cost to complete**

Committed Cost Worksheet

	A	B	C	D	E	F	G	H	I	J	K	L
1									Total		Total	
2									Committed		Estimated	
3								Non-	and Non-	Estimated	Cost	Variance
4					Total		Committed	Committed	Committed	Cost	at	Over /
5			Original	Change	Estimate	Committed	Costs	Costs	Costs	To	Completion	(Under)
6	Code	Description	Estimate	Orders	(C + D)	Costs	Invoiced	Invoiced	(F + H)	Complete	(I + J)	(K - E)
7					—				—		—	—
8					—				—		—	—
9			—	—	—	—	—	—	—	—	—	—

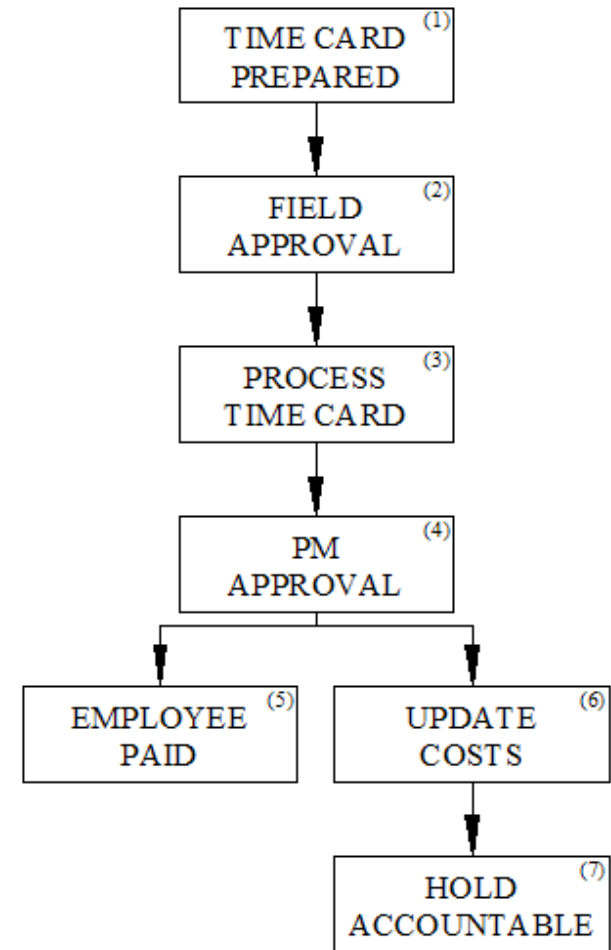
Labor

❑ **STEP 7:** Finally, the **project manager** should **review** the **costs** with the

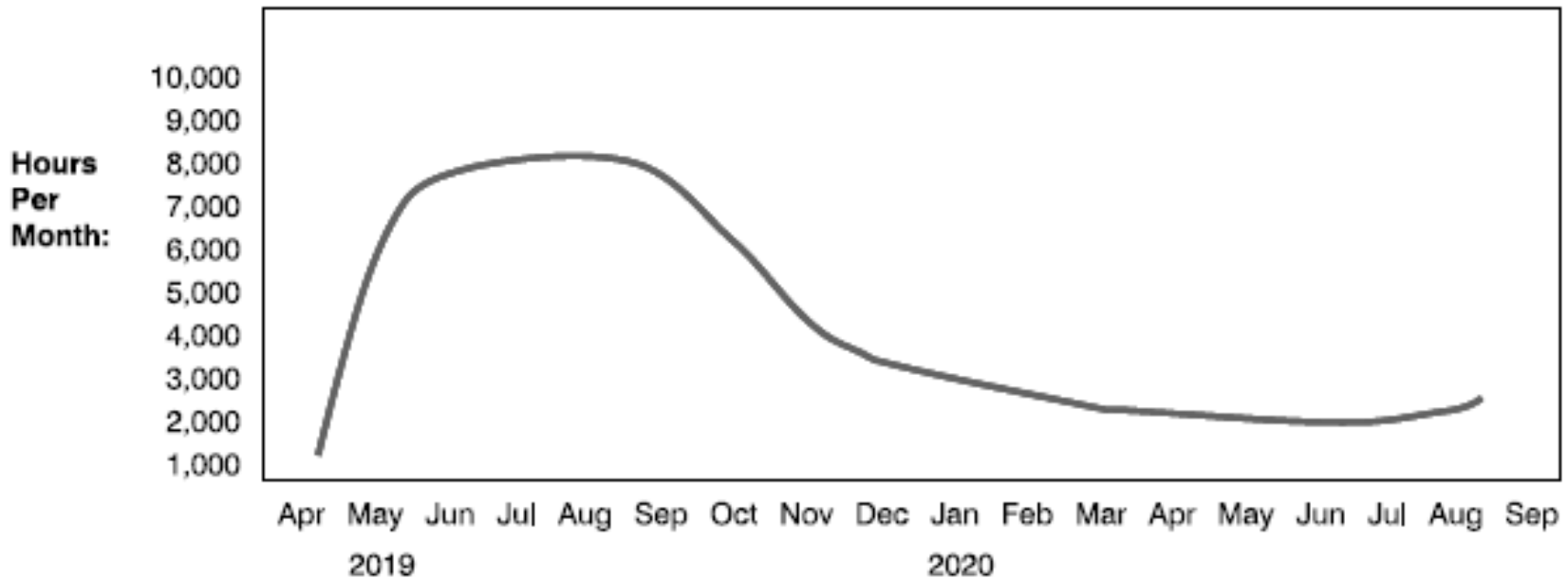
1. **Superintendent**
2. **Crew foreperson**

hold them **accountable** for the **weekly labor costs**.

❖ If the **project manager** does **not** hold field personnel responsible for **their costs**, the company is **simply reporting costs** rather than **controlling costs**.



Evergreen Construction Company
Olympic Hotel and Resort Project
Whole Project Direct Work Labor Curve



Whole project direct work labor curve

This is a overall view

Let's see more detail



Labor

مدیریت مالی، حسابداری و هزینه در پروژه ها و سازمان های پروژه محور

مدیریت هزینه: مدیریت هزینه پروژه

Holm

Project: Olympic Hotel and Resort
System/Area: Doors, Frames, and Hardware

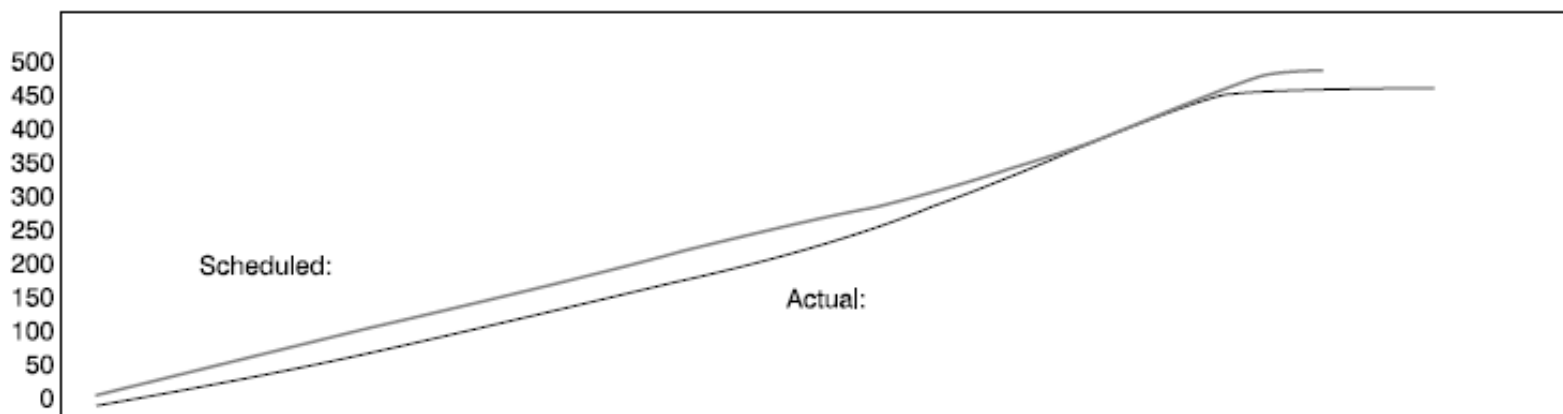
Foreman: Joe Wallace
Date Developed: 11/20/19

Work Days:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Totals:
Estimated Crew Size:	3	3	3	3	3	4	4	4	4	4	4	4	4	4	3	0	0	
Estimated Daily Hours:	24	24	24	24	24	32	32	32	32	32	32	32	32	32	24	0	0	
Accumulated Hours:	24	48	72	96	120	152	184	216	248	280	312	344	376	408	432	432	432	432
Actual Crew Size:	2	2	2	3	3	3	4	4	4	5	5	5	5	2	2	1	1	
Actual Daily Hours:	16	16	16	24	24	24	32	32	32	40	40	40	40	16	16	8	8	
Accumulated Hours:	16	32	48	72	96	120	152	184	216	256	296	336	376	392	408	416	424	424

Manpower Curve:

Hours:



Foreman's cost control work package

Holm

Forecasting		Estimated		To-date			To-go			Total	Variance
Option	Qty	UMH	MH	Qty	UMH	MH	Qty	UMH	MH	MH	+/-
<i>Steel beam over-run scenario:</i>											
A	24	2	48	18	2.5	45	6	0.5	3	48	0
B	24	2	48	18	2.5	45	6	2.5	15	60	-12
C	24	2	48	18	2.5	45	6	2	12	57	-9
<i>Steel beam under-run scenario:</i>											
A	24	2	48	6	1	6	18	2.3	42	48	0
B	24	2	48	6	1	6	18	1	18	24	24
C	24	2	48	6	1	6	18	2	36	42	6

Notes:

Forecasting option 'A' forecasts the original total estimate.

Forecasting option 'B' forecasts the current productivity trend.

Forecasting option 'C' forecasts the original productivity rate.

A variance of - MHs indicates an over-run in cost and a + MH indicates an under-run in cost.

What advantages does it have over the \$ analysis?

Holm

It is better to use hours and not dollars when monitoring direct labor. This is one advantage of estimating with MHs over unit prices for labor. Foremen and superintendents think in terms of crew size and duration. They do not think in terms of \$100 per each to install bath mirrors, rather they have scheduled one carpenter to work three hours on the task.

However, for more in depth analysis you need \$!

Labor Time Reporting

Daily Labor Time Card											
Project <u>Highway Bridge</u>		Project No. <u>200808-05</u>		Weather <u>Cloudy-windy</u>							
Date <u>July 20</u>				Prepared by <u>G.A.S.</u>							
Employee Number	Name	Craft	Time Classification	Hourly Rate	Cost Code					Total Hours	Gross Amount
					03157.10.3	03157.20.3					
132	Winnowich, N.	F	ST	34.00		8				8	\$272.00
			OT								
221	Clouten, S.	C	ST	\$31.00		8				8	\$248.00
			OT								
248	Schluder, L.	C	ST	\$31.00		8				8	\$248.00
			OT								
319	Mills, R.	O	ST	\$33.00		2				2	\$66.00
			OT	0							
143	Gibson, E.	L	ST	\$22.00		8				8	\$176.00
			OT								
417	Sears, K.	L	ST	\$22.00		8				8	\$176.00
			OT								
176	Sibanda, M.	L	ST	\$22.00	2	6				8	\$176.00
			OT								
Total Hours					2	48				50	
Total Cost					\$44.00	\$1,318.00					\$1,362.00

Highway bridge, daily labor time card

Weekly Labor Time Card									
Craft <u>C</u>									
Name <u>Clouten, S.</u>				Project <u>Highway Bridge</u>					
Employee No. <u>221</u>				Project No. <u>200808-05</u>					
Week Ending <u>July 21</u>				Prepared by <u>S.K.S.</u>					
Cost Code	Time Classification	Hourly Rate	Thursday	Friday	Monday	Tuesday	Wednesday	Total Hours	Total Cost
03157.10.3	ST	\$31.00	8					8	\$248.00
	OT								
03157.20.3	ST	\$31.00		8	8	8		24	\$744.00
	OT								
03311.10.3	ST	\$31.00					8	8	\$248.00
	OT								
	ST								
	OT								
	ST								
	OT								
Total Hours	ST		8	8	8	8	8	40	
	OT								
Gross Amount			\$248.00	\$248.00	\$248.00	\$248.00	\$248.00		\$1,240.00
Weather			Clear-hot	Clear-hot	Cloudy-gusty	Cloudy-windy	Cloudy-windy		

Highway bridge, weekly labor time card

- ☐ **“Budget to Date”** is the budget that should have been spent based on the **“to date quantity”**
- ☐ **“To Date”** and **“This Week”** are the **actual costs**
- ☐ **To date should be compared with Budget to Date”**

Weekly Labor Cost Report																
Project		Highway Bridge										Project No. 200808-05				
Week ending		July 21 (working day 27)										Prepared by S.K.S.				
Cost Code (1)	Work Type (2)	Unit (3)	Quantity			Direct Labor Cost				Labor Unit Cost			To Date		Projected	
			Budget (4)	This Week (5)	To Date (6)	Budget (7)	Budget to Date (8)	This Week (9)	To Date (10)	Budget (11)	This Week (12)	To Date (13)	Savings (14)	Loss (15)	Savings (16)	Loss (17)
31220.10.3	Excavation, unclassified	cy	1,667	0	1,667	\$2,643	\$2,643	\$0	\$2,459	\$1.59	-	\$1.48	\$184		\$184	
31222.10.3	Excavation, structural	cy	120	0	120	\$2,985	\$2,985	\$0	\$3,353	\$24.88	-	\$27.94		\$368		\$368
31350.00.3	Pile-driving rig, mob. & demob.	job	-	-	-	*\$4,374	*\$4,374	\$0	\$4,004	\$4,374	-	\$4,004	\$370		\$370	
31361.10.3	Piling, steel, driving	lf	2,240	560	2,016	\$8,224	\$7,402	\$6,373	\$15,762	\$3.67	\$11.38	\$7.82		\$8,360		**\$9,293
03150.10.3	Footing forms, fabricate	sf	360	0	360	\$936	\$936	\$0	\$963	\$2.60	-	\$2.68		\$27		\$27
03150.20.3	Abutment forms, prefabricate	sf	1,810	0	1,810	\$3,548	\$3,548	\$0	\$2,780	\$1.96	-	\$1.54	\$768		\$768	
03157.10.3	Footing forms, place	sf	720	0	360	\$360	\$180	\$0	\$165	\$0.50	-	\$0.46	\$15		\$30	
03159.10.3	Footing forms, strip	sf	720	360	360	\$158	\$79	\$48	\$48	\$0.22	\$0.13	\$0.13	\$31		\$62	
03157.20.3	Abutment forms, place	sf	3,620	1,810	1,810	\$7,312	\$3,656	\$3,504	\$3,504	\$2.02	\$1.94	\$1.94	\$152		\$304	
03311.10.3	Concrete, footing, place	cy	120	0	60	\$1,200	\$600	\$0	\$554	\$10.00	-	\$9.23	\$46		\$92	
*67% of budget for mobilization											Subtotals		\$1,566	\$8,755	\$1,810	\$9,688
**Based on last week, will probably be \$10,087											Totals		⊕	\$7,189	⊕	\$7,878

Highway bridge, weekly labor cost report (#1)

❑ Deviation more than 1 = over budget

❑ Deviation less than 1 = under budget

Weekly Labor Cost Report

Project	Highway Bridge	Project No.		200808-05						
Week ending	July 21 (working day 27)	Prepared by		S.K.S.						
Cost Code (1)	Work Type (2)	Unit (3)	Total Quantity Budgeted (4)	Total Quantity to Date (5)	Percent Completed (6)	Budgeted Direct Labor (7)	Budgeted Labor to Date (8)	Actual Labor to Date (9)	Cost Difference (10)	Deviation (11)
31220.10.3	Excavation, unclassified	cy	1,667	1,667	100.00%	\$2,643	\$2,643	\$2,459	(\$184)	0.93
31222.10.3	Excavation, structural	cy	120	120	100%	\$2,985	\$2,985	\$3,353	\$368	1.12
31350.00.3	Pile-driving rig, mob. & demob.	job	–	–	100%	*\$4,374	\$4,374	\$4,004	(\$370)	0.92
31361.10.3	Piling, steel, driving	lf	2,240	2,016	90%	\$8,221	\$7,399	\$15,762	\$8,363	2.13
03150.10.3	Footing forms, fabricate	sf	360	360	100%	\$936	\$936	\$963	\$27	1.03
03150.20.3	Abutment forms, prefabricate	sf	1,810	1,810	100%	\$3,548	\$3,548	\$2,780	(\$768)	0.78
03157.10.3	Footing forms, place	sf	720	360	50%	\$360	\$180	\$165	(\$15)	0.92
03159.10.3	Footing forms, strip	sf	720	360	50%	\$158	\$79	\$48	(\$31)	0.61
03157.20.3	Abutment forms, place	sf	3,620	1,810	50%	\$7,312	\$3,656	\$3,504	(\$152)	0.96
03311.10.3	Concrete, footing, place	cy	120	60	50%	\$1,200	\$600	\$554	(\$46)	0.92
Totals to Date							\$26,400	\$33,592	\$7,192	1.27

*67% of budget for mobilization

Highway bridge, weekly labor cost report (#2)

Subcontracts

- ❑ Unlike purchase orders, **all bills from subcontractors** must be **reviewed** by the **project manager** **prior** to processing the **payment**.
- ❖ This is **because** most **subcontracts** require **progress payments**, which are based on the **amount of work** that is complete.
- ❖ Determining the amount of **work completed** is more **difficult** **than** determining the **amount of materials** that have been **delivered** to the project.
 - ✓ For this reason, the **project manager** must make the **final decision** as to whether the **bill** from the subcontractor is **fair**.

Subcontracts

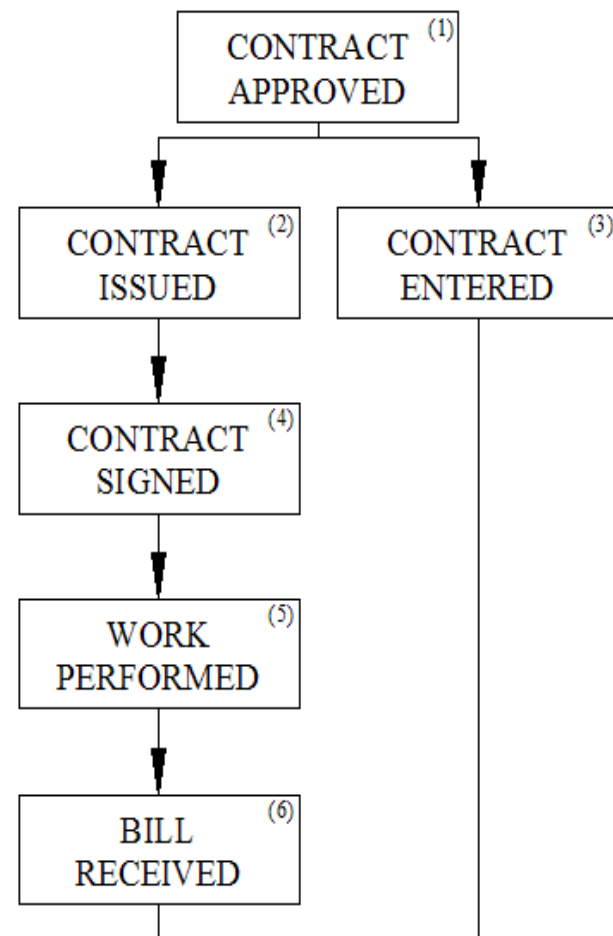
❑ **STEP 1:** The **subcontractors' bids** or **proposals** are checked against:

1. Scope of work
2. Budget

❑ After selecting the **best bid** or **proposal**, a **subcontract** is **prepared** and **approved** by the project manager.

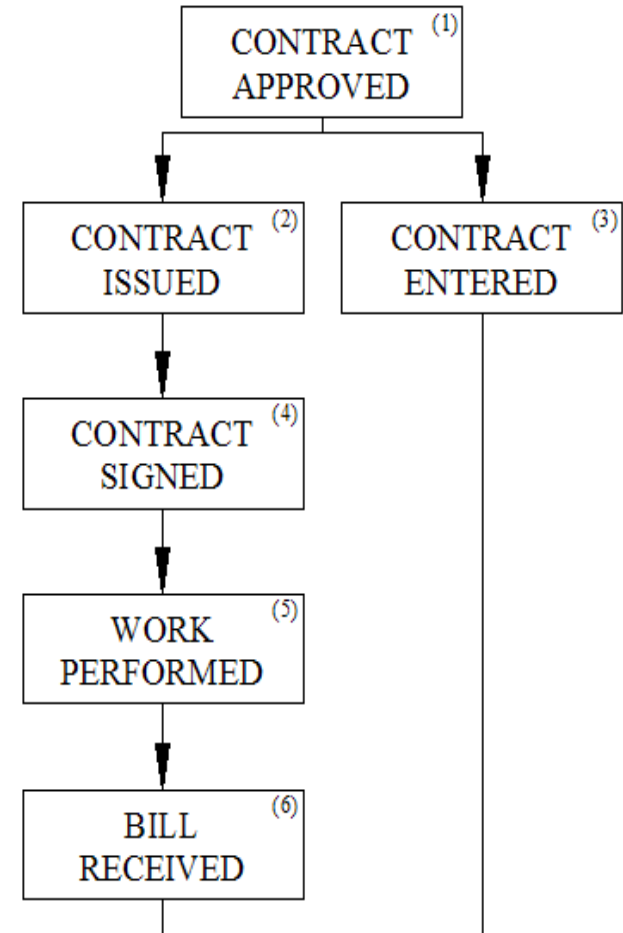
❖ This gives the project manager the opportunity

1. **Check** the cost of the work against the budget,
2. **Seek** other bids,
3. **Make corrections** to the scope of work, and
4. **Negotiate** the delicate point of the contract **before** issuing the subcontract.



Subcontracts

- ❑ **STEP 2:** Once **Step 1** is completed, the **contract** is **issued** to the **subcontractor** (step 2)
- ❑ **STEP 3:** The **contract price** is **entered** into the accounting system as a **committed cost** by the **accounting department** and/or **project manager**.





Committed costs

- ☐ Each **cost code** is entered on a **separate line**.
- ☐ The **cost codes** may or may not be **separated** by **cost type**—labor, materials, equipment, subcontract, and other.
- ☐ **Original estimate** is the **best estimate** of **final cost**
- ☐ **Change orders** that are **approved**
- ☐ **Committed costs** commonly include **subcontract amounts** and **purchase orders** with **known costs**.
- ☐ The costs from the **job cost ledger** are then **divided** into **Column G** and **Column H**.
- ☐ When setting up a **company's cost codes**, it is a **good idea** to set them up in such a manner that makes it **easy to separate committed** from **noncommitted costs**.

Committed Cost Worksheet

	A	B	C	D	E	F	G	H	I	J	K	L
1									Total		Total	
2									Committed		Estimated	
3								Non-	and Non-	Estimated	Cost	Variance
4					Total		Committed	Committed	Committed	Cost	at	Over /
5			Original	Change	Estimate	Committed	Costs	Costs	Costs	To	Completion	(Under)
6	Code	Description	Estimate	Orders	(C + D)	Costs	Invoiced	Invoiced	(F + H)	Complete	(I + J)	(K - E)
7					—				—		—	—
8					—				—		—	—
9			—	—	—	—	—	—	—	—	—	—

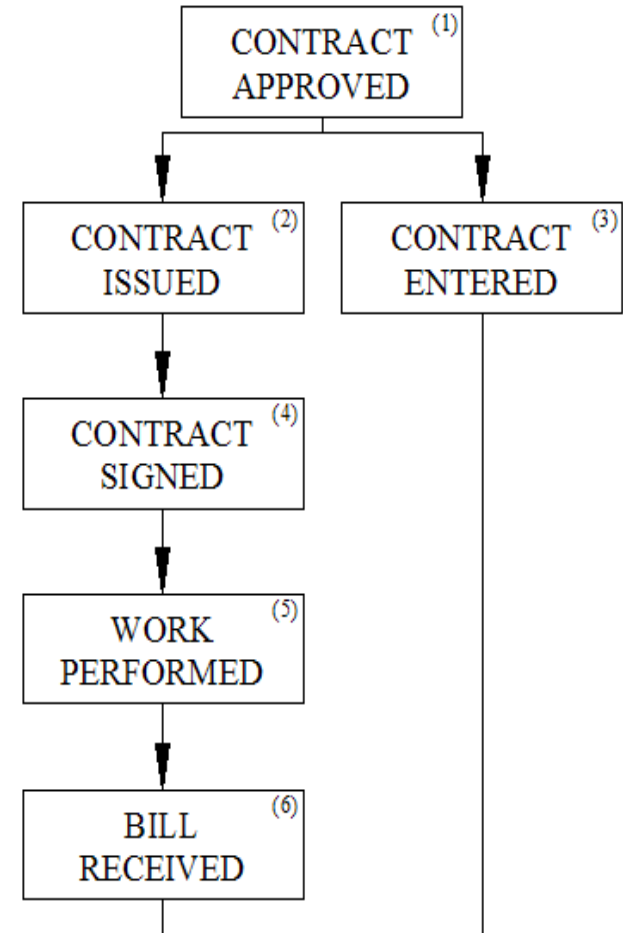
Subcontracts

❑ **STEP 4:** Contract is **signed** by the **subcontractor**.

❑ **STEP 5:** **Project manager** notifies the **superintendent** that the **subcontractor** can **work** on the project.

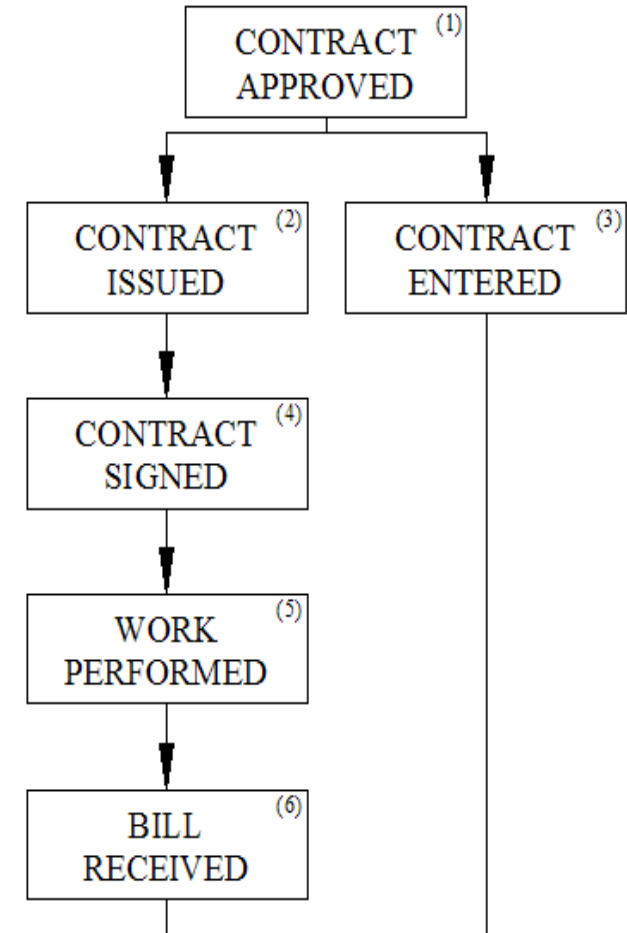
❖ The project manager should send the superintendent a **copy of the contract** so that **superintendent** is aware of

1. Contractor' obligations
2. Subcontractor's responsibilities



Subcontracts

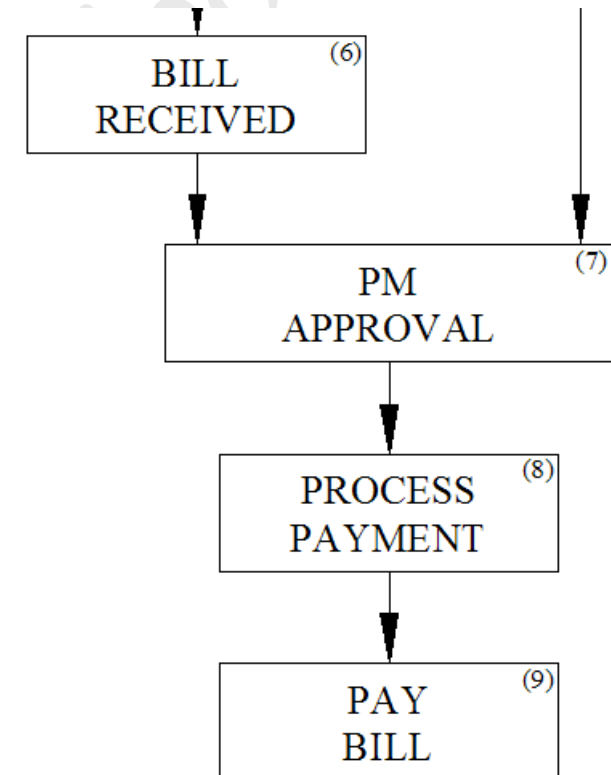
- ❑ **Step 6:** At the **end of a billing period**, the subcontractor **submits a progress bill** to the contractor.



Subcontracts

❑ **STEP 7:** The **project manager**, often in consultation with the **superintendent**, reviews the **bill** and approves it for **payment**, resolving any differences in the **amount of the work**.

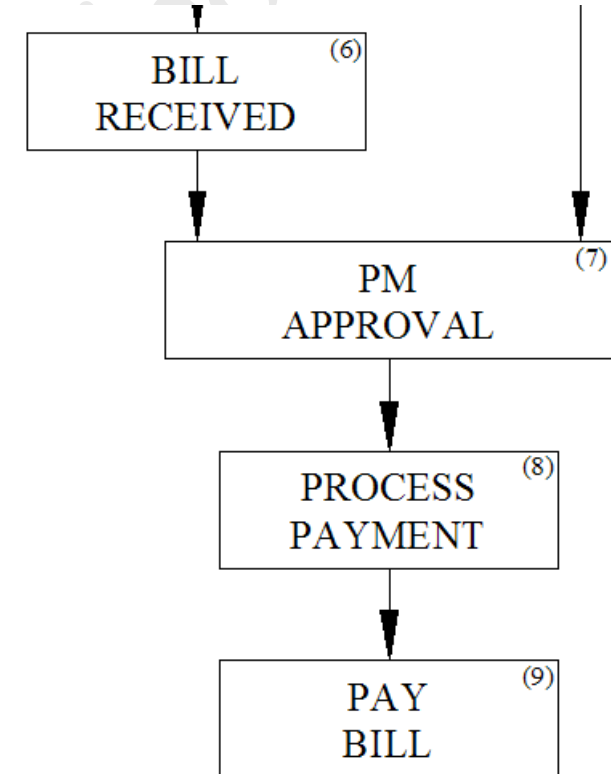
- ❖ The review of the **bill** may include a **trip** to the jobsite to **inspect the progress** or may **rely on progress reports** from the **jobsite**.
- ❖ When reviewing the **bill**, the project manager should **check the bill** against the **contract amount**.
- ❖ At the time the **bill is approved**, it is coded to a job cost code.



Subcontracts

- ❑ **STEP 8:** After **approval** the **payment is processed**
- ❑ **STEP 9:** Payment is **paid** by the accounting department.

Change orders to the contract are handled in the **same manner** as was the **original contract**.





Equipment

- ❑ **Equipment**, like labor, is a **difficult cost** to control.
- ❑ A **time card** should be prepared for each **piece of equipment**.
 1. Some systems provide **hourly (if not more often) updates**,
 2. Others **download the data** when the equipment **returns to the yard at the end of the day**.
- ❑ These systems may be used to
 - (1) **Monitor the performance** of equipment including start time, stop time, engine hours, and excessing idling time
 - (2) **Track the type of work** being performed as reported by the operator
 - (3) **Automatically track and schedule equipment maintenance** based on hours of operation
 - (4) **Send alerts to management** if equipment is **moved** or operated during **off hours**, preventing **theft** and **misuse** of equipment.

Equipment

- ❑ If an **employee** is **always using** a piece of **equipment**—
 - ❖ for example, a **truck** that is used **solely** by a **superintendent**—
the **employee's time card** may be used **in lieu of** a **equipment time card**.

*The **equipment time cards** are processed in the **same manner** as the **labor time cards**.*

Equipment

❑ Equipment may be **billed** to a **job** based on

- ❖ Number of hours or
- ❖ Number of days

❑ Equipment is **charged** to a project in **two orders**:

1. **Expected cost**
2. **Actual cost**

Equipment

1. Costs being billed to the projects based on the **expected cost** at the **beginning of the year** or **during the year** are not the actual costs but the expected or projected average **hourly** or **daily** costs for the year.
- ❑ There is a great deal of **uncertainty** in the **expected costs** because of the
 1. **Uncertainty** in the number of billable **hours** or **days** that will **occur** during the year
 2. **Uncertainty** in some of the **costs** will be **imposed** during the year
 - ❖ **Ownership costs** are **easy** to estimate
 - ✓ Rent and lease payments, depreciation, taxes, licenses, and insurance
 - ❖ **Operation costs** **difficult** to estimate
 - ✓ Repairs, maintenance, fuel, and lubrication—**vary** with **(1) conditions** and **(2) operators' skill**

Equipment

2. At the **end of the year**, the **allocation** of equipment costs should **equal** the **actual** costs.

- ❖ If management **underallocates costs**—the **expected costs** are **too low**—this will **decrease** the **project costs** and may **show** that a budget item is **on** or **under budget**, when in **reality** the item is **over budget**, yet management **does not know**.
- ❖ If management **overallocates costs**—the **expected costs** are **too high**—this will **increase** the **project costs** and may **show** that a budget item is **over budget** while this is only **because of overallocation**, **not** reality.

Other (project overhead costs)

- ❑ Where **possible**, the other cost type items should have **purchase orders** and be handled in the **same manner** as **material purchases**.
- ❖ However, there are many items—such as **utility bills**—that **cannot** be handled in this manner.
 - ✓ Bills **such as these** should be sent to the **project manager (or superintendent)** for **approval** and **cost coding** before processing and **paying the bill**.

General overhead costs

- ☐ **General overhead** costs should be handled in the **same manner as project costs**, with the **general manager** approving the **purchase orders** and **contracts**.
- ☐ Like monitoring project costs, the **general overhead costs** should be **compared** to a **budget** on a **weekly** or **monthly** basis.
- ☐ Costs that are **not actively monitored** and **controlled** will quickly become **out of control**.

Recording general overhead invoices

❑ Recording an expense

BALANCE SHEET		INCOME STATEMENT	
ASSETS	LIABILITIES	EXPENSES	REVENUES
	310 Accounts Payable - Trade 500.00	846 Telephone 500.00	
	EQUITY		
	430 Current Period Net Income (500.00)	PROFIT (500.00)	
0 =	0	0 =	0

Monitoring project profitability

- ❑ The costs for **each project** should be monitored at least **weekly**.

REMEMBER SHORT INTERVAL SCHEDULE?

- ❖ The process of hiring **subcontractors** and procuring **material costs** are often monitored on a more frequent basis.

- ❑ The **monitoring** should include:

- ❖ Monitoring the **job costs** against a **budget**
- ❖ Updating the **cost to complete**
- ❖ Calculating **Estimated cost at completion** for **each budget item**
- ❖ Calculating **Committed costs**

Monitoring project profitability

❑ Accounting system **does not** provide a report with **committed costs** and the **estimated cost at completion**?

❖ As is the case in the job cost report here

✓ You should also use another spreadsheet like next page

Job: 317 Weston Apartments							July 16, 2004		
Code	Description	Contract Amount	Billed to Date	Actual	Budget	Overrun	Actual	Budget	Overrun
Phase 1: Bldg 1									
06110	Rough Carpentry	35,000.00	25,000.00	29,375.21	29,200.00	175.21	1,295	1,300	-5
06120	Lumber	42,000.00	39,000.00	36,579.32	37,000.00	-420.68	0	0	0
06150	Trusses	15,000.00	0.00	13,560.00	13,560.00	0.00	0	0	0
	Phase Total	92,000.00	64,000.00	79,514.53	79,760.00	-245.47	1,295	1,300	-5
Phase 2: Bldg 2									
06110	Rough Carpentry	35,000.00	0.00	11,526.33	29,200.00	-17,673.67	526	1,300	-774
06120	Lumber	42,000.00	0.00	18,265.35	37,000.00	0.00	0	0	0
06150	Trusses	15,000.00	0.00	0.00	13,560.00	-13,560.00	0	0	0
	Phase Total	92,000.00	0.00	29,791.68	79,760.00	-31,233.67	526	1,300	-774
	Job Total	184,000.00	64,000.00	109,306.21	159,520.00	-31,479.14	1,821	2,600	-779

Sample Job Cost Report

Monitoring project profitability

- ☐ **Committed costs** and the **estimated cost at completion** should be **monitored** in the following spreadsheet.

	A	B	C	D	E	F	G	H	I	J	K	L
1									Total		Total	
2									Committed		Estimated	
3								Non-	and Non-	Estimated	Cost	Variance
4					Total		Committed	Committed	Committed	Cost	at	Over /
5			Original	Change	Estimate	Committed	Costs	Costs	Costs	To	Completion	(Under)
6	Code	Description	Estimate	Orders	(C + D)	Costs	Invoiced	Invoiced	(F + H)	Complete	(I + J)	(K - E)
7					—				—		—	—
8					—				—		—	—
9			—	—	—	—	—	—	—	—	—	—

Committed Cost Worksheet

Sources of cost overrun

❑ **Project manager** investigates the **source of the overrun** such as:

1. Clerical errors (e.g., miscoded bills)
2. Budgeting and estimating errors
3. Unexpected conditions (e.g., unexpectedly cold winter)
4. Poor execution of the work (e.g., bad planning or poor productivity)

What if project manager found the sources of overrun?

1. Clerical errors

- ❖ When they are **found**, they should be sent to the **accounting department** for **correction**.
- ❖ When **corrections** have been **made**, the **cost** should be **updated**.

What if project manager found the sources of overrun?

2. Budgeting and estimating errors

- ❖ When they are found, internal change order should be issued to **move money** from the **contingency** to the **category** in which the **error occurred**.
 - ✓ **Internal change order**? Change order that does **not need to be approved** by the **project's owner**.
 - *External change order is a wide concept that you will learn in Claim Management*
- ❖ What if we **pay less than budget**?
 - ✓ An internal change order should be generated to **move the excess funds** for the budget line item into the contingency.

What if project manager found the sources of overrun?

Job: 317 Weston Apartments							July 16, 2004		
Code	Description	Contract Amount	Billed to Date	Actual	Budget	Overrun	Actual	Budget	Overrun
Phase 1: Bldg 1									
06110	Rough Carpentry	35,000.00	25,000.00	29,375.21	29,200.00	175.21	1,295	1,300	-5
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06150	Trusses	15,000.00	0.00	13,560.00	13,560.00	0.00	0	0	0
	Phase Total	92,000.00	64,000.00	79,514.53	79,760.00	-245.47	1,295	1,300	-5
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06150	Trusses	15,000.00	0.00	0.00	13,560.00	-13,560.00	0	0	0
	Phase Total	92,000.00	0.00	29,791.68	79,760.00	-31,233.67	526	1,300	-774
	Job Total	184,000.00	64,000.00	109,306.21	159,520.00	-31,479.14	1,821	2,600	-779

Sample Job Cost Report

What if project manager found the sources of overrun?

3. Unexpected conditions

❖ Some unexpected conditions—such as **flood** or **earthquake**—are billable as a change order to the **project's owners**.

✓ *External change order...Do not use from your contingency!*

○ **Winter snow** is **not unexpected conditions** if it could have been **predicted**. It is poor execution of the work.

❖ If it is **unexpected conditions** that **cannot** be billed to the **owner**, internal change order is issued and the **cost** is covered by **contingency**.

What if project manager found the sources of overrun?

4. Poor execution of the work

- ❖ **Completely** within **control** of the **project management team**.
- ❖ If **budget** is **realistic**, then the **cost overruns** are due to **poor execution** and **cost underruns** are due to **good execution** on the part of the **project management**.
- ❖ The **project management team**, including the project manager, should be held **accountable** on a **weekly** basis for:
 - ✓ Financial success
 - ✓ Progress
 - ✓ Schedule of the project
 - ✓ Labor and equipment hours (should be tracked and recorded in the accounting reports)
 - Productivity of the employees and equipment

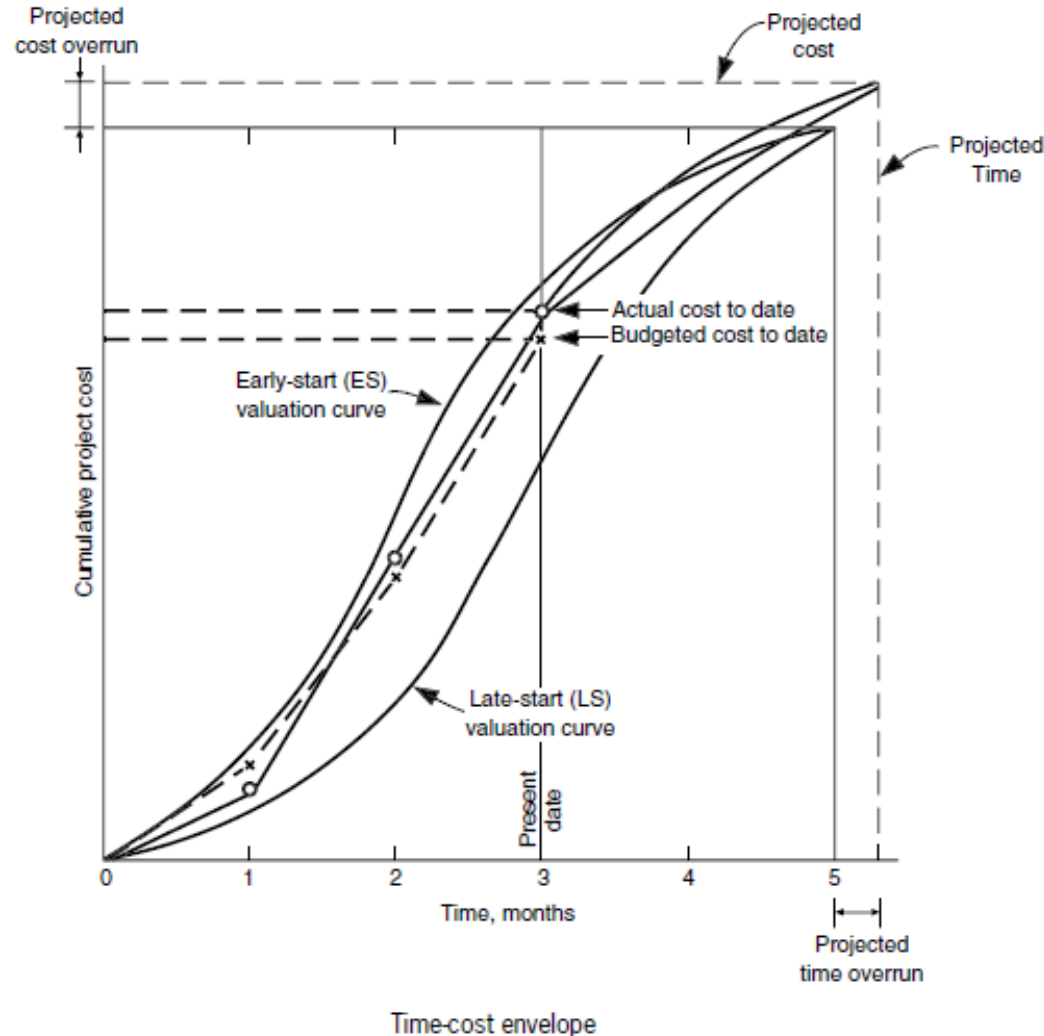
What have been done so far?

- ❑ So far, the **reports** provide **project manager** with a **means** of **identifying** the **root causes** of **reported variances**.
- ❑ There is also a **need** for a **more general kind of cost report** that provides a **quick** and **concise** picture of the **overall cost status** of the project.
 - ❖ This is called **Time-cost envelope**.
 - ✓ This summary information is for **use** by
 - **Top project management,**
 - **Owners,**
 - **Lending agencies, and**
 - **Others.**

Time-cost envelope

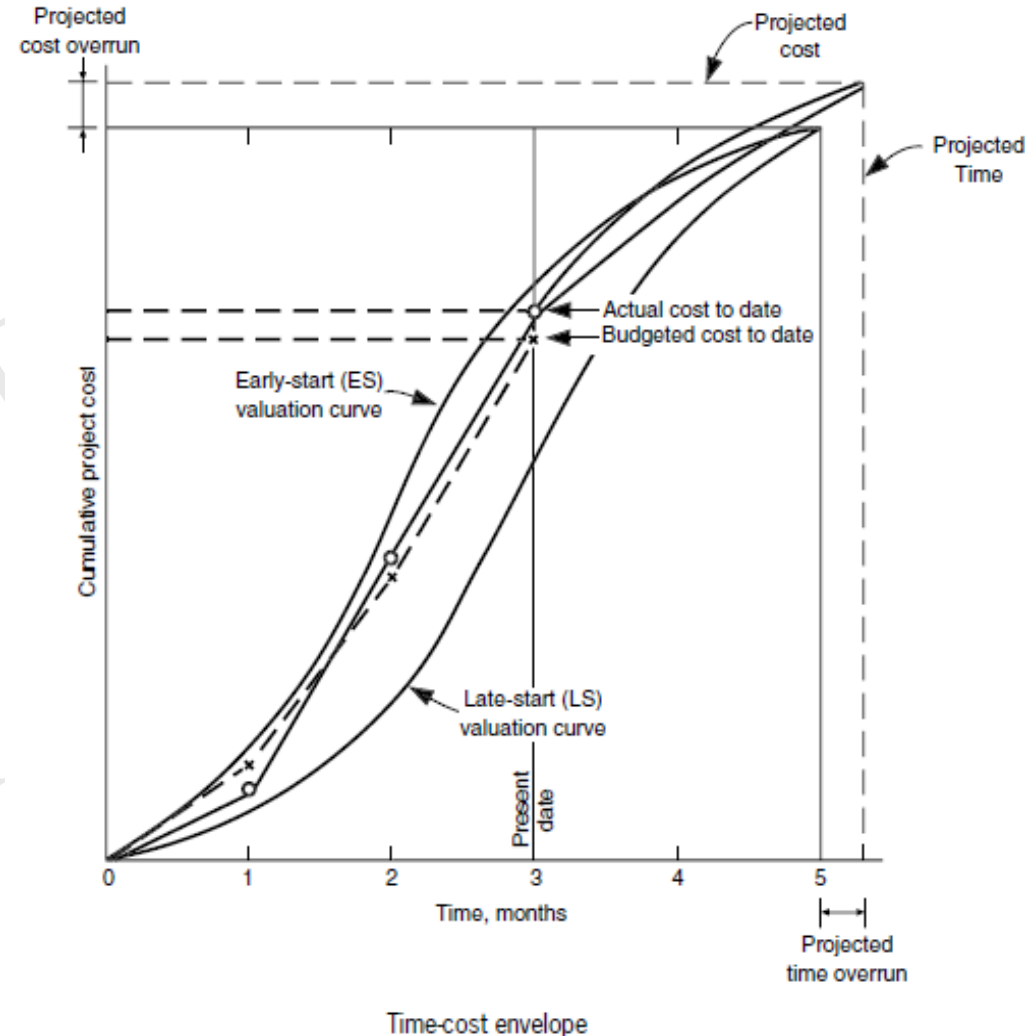
❑ Project time-cost envelopes are graphical **cost summaries** that are **also** used for **job-cost monitoring**.

❑ A **cost envelope** is obtained by plotting cumulative estimated job costs against project time.



Time-cost envelope

1. **Two curves** are drawn, one on the basis of an **early-start schedule** and the other on a **late-start schedule**.
2. After two extreme condition curves are drawn, the **total actual cost to date** is plotted in **each month** (small circles).
3. The **budgeted cost** of the work accomplished to date is plotted concurrently (**dashed line**)
4. **Projected project cost overrun** and a **projected early completion** drawn



Earned value management system (EVMS)

- ❑ **Good scheduling** is a part of **controlling costs** because **schedule overruns** increase **project costs** by increasing **project overhead costs**.
- ❑ A common way of measuring the **schedule** and the **cost efficiency** of a project is through the use of **earned value**.
- ❑ The **Earned Value Management System (EVMS)**, sometimes referred to as **Cost/Schedule Control Systems Criteria**, is an **extension of the time-cost envelope principle**.

Earned value management system (EVMS)

- ❑ **US approach** and used on **major projects**.
- ❑ **Emerged** as a **financial analysis** specialty in **US government programs** in **1960s** and **took root** in the **United States Department of Defense** in 1960s.
- ❑ Conceived by **industrial engineers**.
- ❑ The **construction industry** was an early **commercial adopter** of **EVM**. **Closer integration** of **EVM** with the **practice of project management** accelerated in the **1990s**.
- ❑ **UK construction sector** has been **reluctant** to embrace the **concept of EVMS**.



Earned value management system (EVMS)

❑ There is the **difficulty inherent** for any **periodic monitoring** of **synchronizing data** timing:

❖ **Actual deliveries, actual invoicing, approved change orders, and the date the EVM analysis** is done are **all independent**

1. So that some **items have arrived** but their **invoicing** has **not** and
2. By the **time analysis** is **delivered** the **data** will likely be **weeks behind events**.

This may **limit EVM** to a **less tactical** or **less definitive** role where use is **combined** with **other forms**.

Earned value management system (EVMS)

- ❑ Proper project planning includes, among many others, documenting requirements well and creating a good work breakdown structure – are essential for EVM.

*If the **project plan is faulty**, EVM will result in **misleading results**, which are not only a waste of time, effort, and cost, but may also lead to **project failure**.*

What are the concerns about EVM?

Earned value management system (EVMS)

What are the concerns about EVM?

1. EVM is too expensive to implement
2. EVM is not useful for short-term, small-dollar projects
3. EVM practices go above and beyond basic program management practices
4. EVM is merely a government reporting requirement
5. Reports are a key product of EVM
6. EVM is a financial management tool
7. EVM data are backward looking and too old to be useful
8. Variances EVM reveals are bad and should always be avoided
9. No one cares about EVM data
10. EVM does not help with managing a program
11. My program is using agile software and we do not need EVM to manage the program



Earned value management system (EVMS)

- ❑ EVMS compares the **physical work accomplished to date** with both
 1. **Actual cost** and
 2. **Planned work** to be accomplished.
- ❑ **Seven indexes** to measure the **performance** of a project:
 - ❖ Schedule performance index (SPI)
 - ❖ Cost performance index (CPI)
 - ❖ Schedule variance (SV)
 - ❖ Cost variance (CV)
 - ❖ Estimated cost at completion (EAC)
 - ❖ Estimated to complete (ETC)
 - ❖ To complete performance index (TCPI)
- ❑ **Four values** to calculate **seven indexes**
 - ❖ Actual cost of the work performed (ACWP)
 - ❖ Budgeted cost of the work scheduled (BCWS) or planned value (PV)
 - ❖ Budgeted cost of the work performed (BCWP) or earned value (EV)
 - ❖ Budgeted cost at completion (BAC)

*Indexes are **measured** at the **same date**.*

Earned value management system (EVMS)

GAO

EVM Process

The EVM process can be broken down into thirteen fundamental activities, outlined and described in this section:

1. define the scope of effort with a WBS;
2. identify who in the organization will perform the work;
3. schedule the work to a timeline;
4. estimate resources and authorize budgets;
5. determine objective measures of earned value;
6. develop the performance measurement baseline;
7. execute the work plan and record all costs;
8. analyze EVM performance data and record variances from the performance measurement baseline (PMB) plan;
9. forecast estimates-at-completion (EACs) using EVM;
10. conduct an integrated cost-schedule risk analysis;
11. compare EACs from EVM (9) with EAC from risk analysis (10);
12. take management action to respond to risks; and
13. update the performance measurement baseline as changes occur.

STEP 1: Define the scope of effort using a WBS

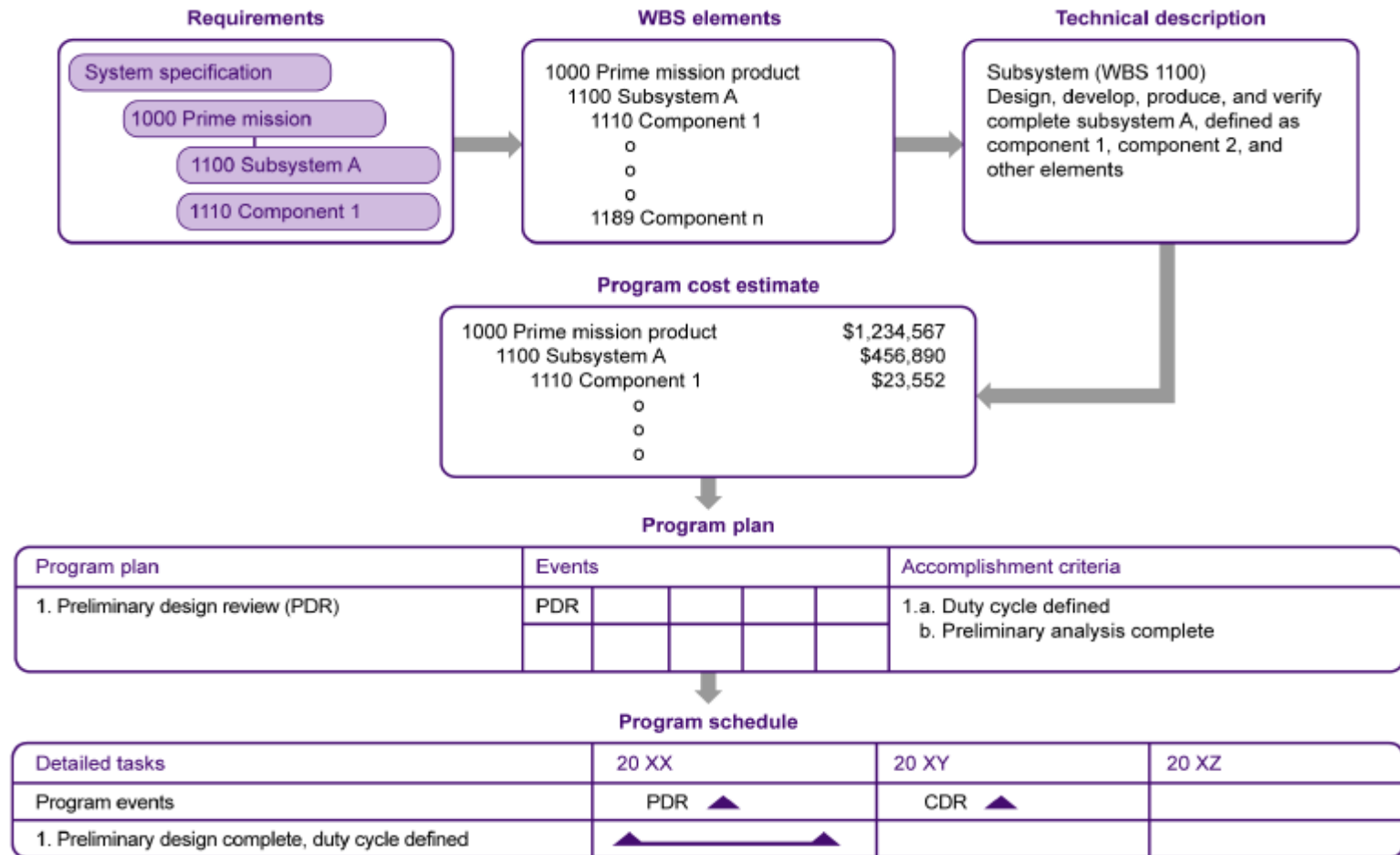
- ☐ The **WBS**, a **critical component** of **EVM** that defines the work to be performed, should be the **basis** of the cost estimate and the project schedule.
- ☐ There should be **only One WBS** for each program,
- ☐ It should **match the WBS** used for the cost estimate and schedule
- ☐ So that actual costs can be fed back into the estimate and there is a **correlation** between the cost estimate and Schedule.

STEP 1: Define the scope of effort using a WBS

- ❑ While costs are usually tracked at lower levels,
what is reported in an **EVM** system is usually summarized at a **higher level**
(**working packages or control accounts**),
perhaps matching the **summary level of the schedule** that is often used for
a **schedule risk analysis**, facilitating the preparation of an
integrated cost-schedule risk analysis.

STEP 1: Define the scope of effort with a WBS

Work Breakdown Structure Integration of Cost, Schedule, and Technical Information



Source: Copyright © 2018, National Defense Industrial Association (NDIA), Integrated Program Management Division, *Earned Value Management Systems Application Guide*. All rights reserved. | GAO-20-195G

Note: CDR = critical design review.

STEP 2: Identify who in the organization will perform the work?

- ❑ Once the **WBS** has been established,

the next step is to **assign someone** to do the work (**OBS** and **WBS**).

- ❑ The **control account** becomes the management **focus of an EVM system** and the **focal point** for **performance measurement**.
- ❑ It is usually at the **control account level** that **actual costs** are **collected and variances** from the **baseline plan** are reported in the **EVM system**.
- ❑ A **control account manager** is responsible for managing, tracking, and reporting all earned value data defined within each control account.

*Thus, **control accounts** are the **natural control point** for **EVM planning and management**.*

Which one? Control accounts of working packages?

STEP 2: Identify who in the organization will perform the work?

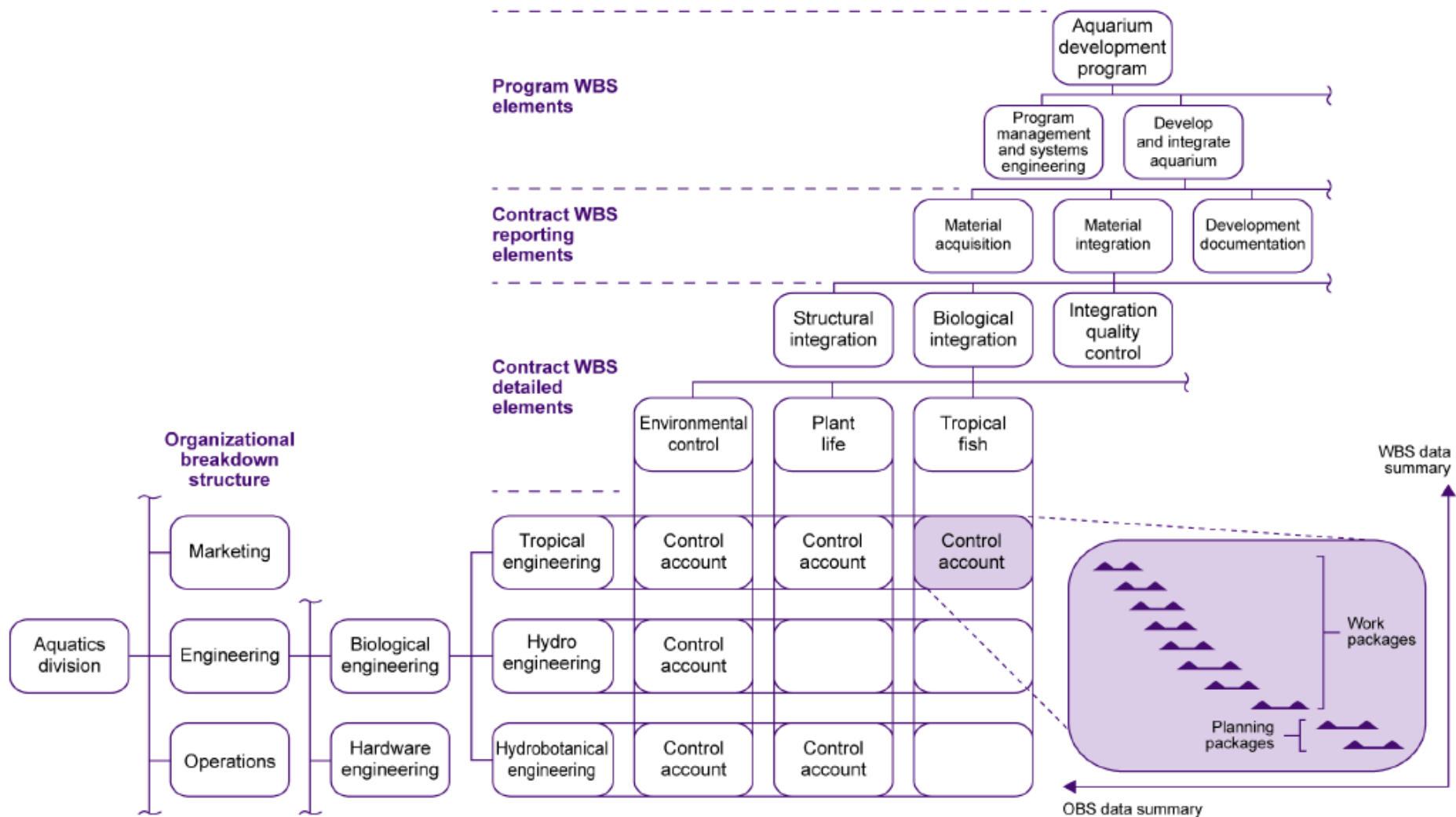
Which one? Control accounts of working packages?

1. For the jobsite (superintendents and crew levels): Working packages
2. For the higher level of managers: Control account

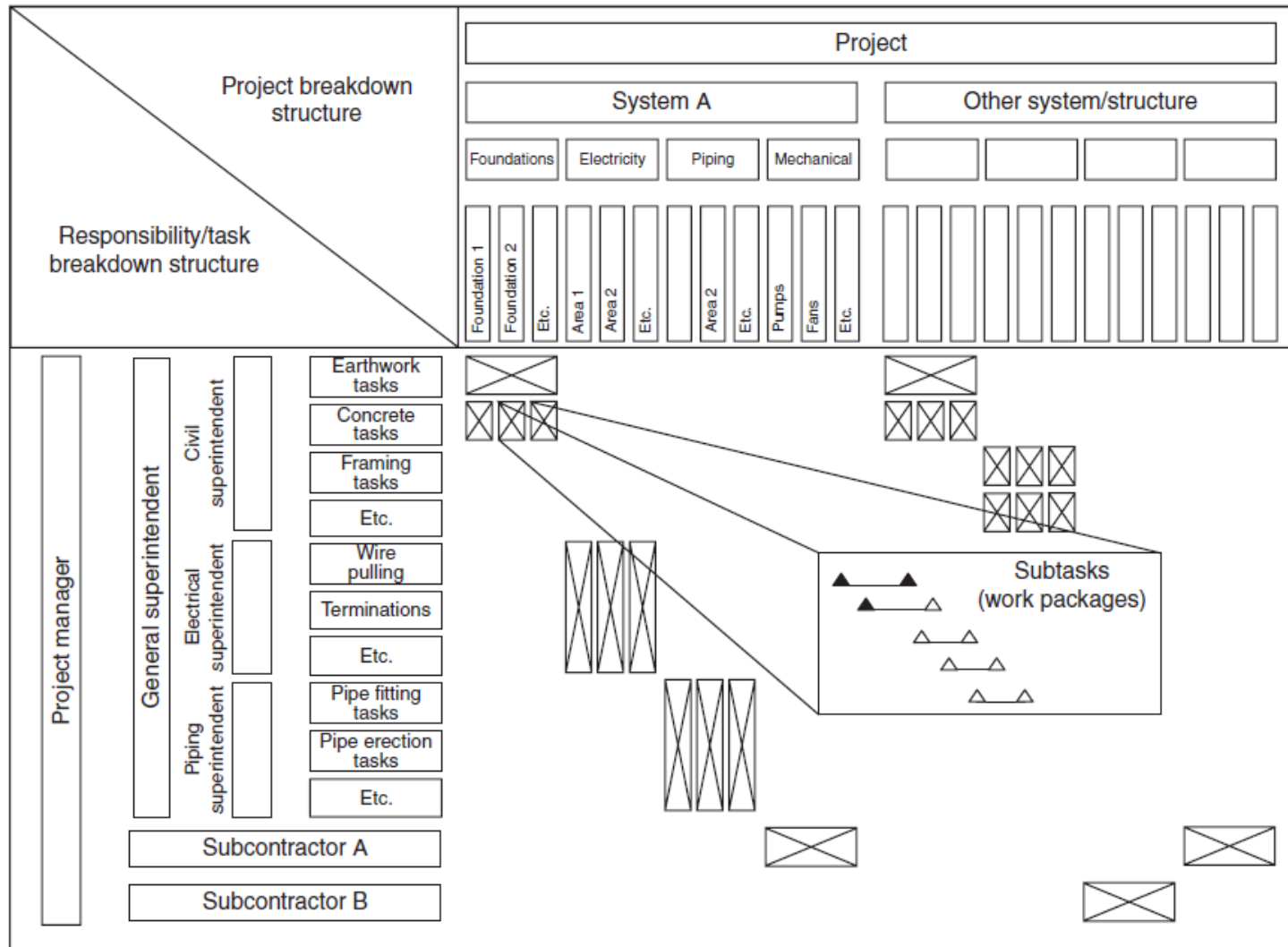
I will show you the **reason** why we also need it in the level of
working packages in the jobsite!

STEP 2: Identify who in the organization will perform the work?

Identifying Responsibility for Managing Work at the Control Account



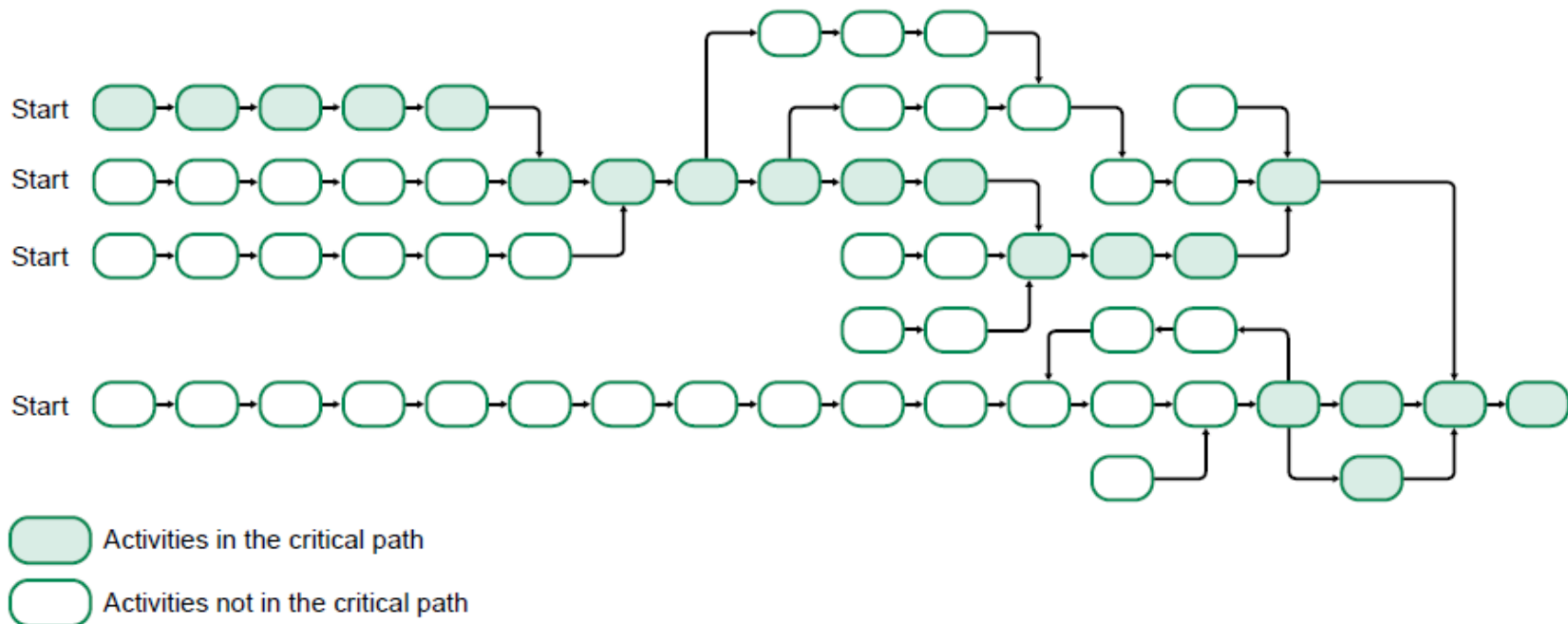
STEP 2: Identify who in the organization will perform the work?



Project control matrix with scheduling of subtasks.

STEP 3: Schedule the work to a timeline

An Activity Network



Source: © 2005 MCR LLC, "Schedule Risk Analysis."

STEP 3: Schedule the work to a timeline

Activity Durations as a Gantt Chart

ID	Name	Start	2002, Qtr 2			2002, Qtr 3			2002, Qtr 4			2003, Qtr 1		
			Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	Event 1	4/28/02												
2	Accomplishment 1.1	4/28/02												
3	Criterion 1.1.1	4/28/02												
4	Task 1.1.1.1	4/28/02												
5	Criterion 1.1.2	5/12/02												
6	Task 1.1.2.1	5/12/02												
7	Accomplishment 1.2	5/5/02												
8	Criterion 1.2.1	5/5/02												
9	Task 1.2.1.1	5/5/02												
10	Event 2	5/3/02												
11	Accomplishment 2.1	5/3/02												
12	Criterion 2.1.1	7/26/02												
13	Task 2.1.1.1	7/26/02												
14	Criterion 2.1.2	5/3/02												

Source: DOD.

STEP 4: Estimate resources and authorize the budgets

☐ We talked about this...

Prepared by Dr. Alavipour
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STEP 5: Determine objective measures of earned value

- ☐ **Performance measurement** is key to earned value because **performance** represents the **value of work accomplished**.
- ☐ **Before any work is started**,
the **control account managers** or **teams** should determine **which performance measures** will be used to **objectively determine** when **work is completed**.
- ☐ These measures are used to **report progress** in **achieving milestones** and should be integrated with **technical performance measures**.
- ☐ No one method for measuring earned value status is **perfect for every program**.
 - ❖ Several WBS elements may use **different methods**.

Let's see how to measuring earned value performance!

STEP 5: Determine objective measures of earned value

PMI Best Practice

TCM Framework (AACE International, 2012) also acknowledges in Section 9.2.2.2 these methods for monitoring progress.

Various methods for Earned Value Management (EVM) include:

- **Fixed Formula**

A typical example of fixed formula is **50/50 technique**. With this method 50% of work is considered completed when the work has started, regardless of how much work is finished. The remaining 50% is achieved at completion of work.

- **Weighted Milestone**

The weighted milestone technique divides the work to be completed into segments, each ending with an observable milestone; it then assigns a value to the achievement of each milestone. The weighted milestone technique is more suitable for longer duration tasks having intermediate, tangible outcomes.

- **Percent Complete**

The percent complete technique is among the simplest and easiest, but can be the most subjective of the earned value measurement techniques if there are no objective indicators to back it up. This is the case when, at each measurement period, the responsible worker or manager makes an estimate of the percentage of work complete.

STEP 5: Determine objective measures of earned value

PMI Best Practice

- **Apportioned Effort**

If a task has direct, supportive relationship to another task that has its own earned value, the value of the support task may be determined based on (or apportioned to) the earned value of the reference base activity. Examples of proportional tasks include quality assurance and inspection activities.

- **Level of Effort**

Some project activities do not produce tangible outcomes that can be measured objectively. Examples include project management and operating a project technical library. These activities consume project resources and should be included in earned value management planning and measurement. In these cases, the level of effort (LoE) technique is used for determining earned value. A planned value is assigned to each LoE task for each measurement period. This planned value is automatically credited as the earned value at the end of the measurement period.

- **Remaining Duration**

One of the most reliable ways to determine the status and progress of a scope of work is to determine the remaining amount of time that is needed to complete the scope of work represented by the activity once that work has started. Most construction superintendents have a very clear idea how much longer an activity is going to take to complete it versus determining percent complete or some other method described above.

Remember all of these methods we discussed in Planning and Scheduling Course?

Remember CII documents?

Remember Engineering Projects?

STEP 5: Determine objective measures of earned value

GAO

: Typical Methods for Measuring Earned Value Performance

Method	Description
Fixed formula (0/100, 50/50, 25/75, etc.)	A specified percentage of the earned value is assigned to the start milestone of the work package. The remaining earned value is assigned when the work is complete. Used for smaller work packages planned to start and end within two reporting periods. The 0/100 technique should only be used on work packages planned to start and end within one reporting period. This technique is commonly used for receipt of materials.
Percent complete	Performance is measured by an estimate of the percentage of work completed. This should be based on objective and quantifiable work completion. The percent complete for each work package is the cumulative value of the work accomplished to date divided by the total budget for the work package.
Weighted milestone	This method divides the work package into measurable segments, each ending with an observable milestone. A weighted value is assigned to the completion of each milestone. This method is more suitable for longer duration work packages that have intermediate and tangible results. For the most effective use, the method requires at least one interim milestone for each reporting period.
Physical measurement	Measurement can include any units that can be explicitly related to the completion of work. Examples may include length of cable laid, quantity of concrete poured, or the quantity of similar units.

Source: Project Management Institute, Inc. *Practice Standard for Earned Value Management*, Second Edition, 2011. | GAO-20-195G

STEP 5: Determine objective measures of earned value

Two other methods used to measure earned value include level of effort and apportioned effort. Both are subjective, however, and should only be used when no other method discussed in the table above is applicable.

Let's see more details!

STEP 5: Determine objective measures of earned value

- ❑ Programs that report using a **high level of effort** for measuring earned value *are not providing objective data and the EVM system will not perform as expected.*
 - ❖ As **a general rule**, if **more than 15 percent** of a program's budget is classified as **level of effort**,
then the amount should be carefully reviewed.
- ❑ While the **15 percent benchmark is widely accepted** as a trigger point for analysis, **no given percentage** should be interpreted as a **hard threshold**,
because the nature of work on some programs and contracts does not always lend itself to more objective measurement.

STEP 5: Determine objective measures of earned value

❑ **Apportioned effort work packages** can be as discretely defined as **individual work packages**,

but **apportioned effort tasks** are unique because they are **closely dependent** on another distinct work package.

- ❖ *Examples include **quality control** responsibilities associated with **pipefitting or pouring concrete**.*
- ❖ *These **quality control activities** should span their dependent activities and their **earned value** should be based on the **related activities' earned value**.*

STEP 5: Determine objective measures of earned value

- ❑ As work is performed, it is earned using the **same units as it was planned** with, whether **dollars, labor hours, or other quantifiable units.**
- ❖ Therefore, the **budget value of the completed work** is credited as earned value, which is then **compared to the actual cost** and **planned value** to determine **cost and schedule variances.**

STEP 5: Determine objective measures of earned value

Earned Value, Using the Percent Complete Method, Compared to Planned Costs

					Performance		
					Task budget	Task % complete	Earned value
Tasks	Week 1	Week 2	Week 3	Week 4			
1 Set steel columns and beams	▲	▲			\$125	100%	\$125
2 Install first floor joists and decking		▲	▲		\$250	100%	\$250
3 Frame first floor walls; install wall sheathing		▲	▲		\$720	25%	\$180
4 Install roof trusses			▲	▲	\$240	0%	\$0
5 Install roof decking			▲	▲	\$280	0%	\$0
6 Inspect rough-in framing				▲	\$100	0%	\$0
7 Framing complete				⊗	\$10	0%	\$0
8							
9 Total project					\$1,725		\$555

▲ Scheduled milestones/activities

▲ Completed milestones/activities

Source: GAO. | GAO-20-195G

STEP 6: Develop the performance measurement baseline

Integrated baseline review (IBR)

1. Work definition:

- a WBS should be developed;
- specifications should flow down to subcontractors;
- internal statement of work for work package definitions should be defined.

STEP 6: Develop the performance measurement baseline

Integrated baseline review (IBR)

2. Integrated schedule:

- ■ lowest and master level should be vertically integrated;
- ■ tasks should be horizontally integrated;
- ■ product handoffs should be identified;
- ■ subcontractor schedules should be integrated with the prime master schedule.

STEP 6: Develop the performance measurement baseline

Integrated baseline review (IBR)

3. Resources, labor, and material should be fully planned and scheduled;

- constrained resources should be identified or rescheduled;
- staffing resources should be leveled off;
- subcontractor baselines should be integrated with the prime baseline;
- schedule and budget baselines should be integrated;
- work package earned value measures should be defined;
- the baseline should be validated at the lowest levels and approved by management.

STEP 6: Develop the performance measurement baseline

- ❑ After it has been determined that the program is **defined at an appropriate level**, interviewing control account managers is the next key IBR objective.
- ❖ Discussions should take place among a small group of people, **addressing** how the baseline was developed and the supporting documentation.
- During the interview process,
the IBR team meets with specific control account managers to understand how well they use EVM to manage their work and whether they have expertise in their area of discipline.

STEP 6: Develop the performance measurement baseline

□ Typical **discussion questions** involve:

1. How the control account managers receive work authorization,
2. How they ensure that the technical content of their **effort is covered**,
3. How they **use the schedule** to **plan and manage their work**.

STEP 6: Develop the performance measurement baseline

IBR Control account manager discussion template

- ❑ A template gives interviewers a consistent guide to make sure they cover all aspects of the IBR objectives.

Baseline discussion starter					
Step 1	Introductions				5 minutes
Step 2	Overview of control accounts General description, work content				5 minutes
Step 3	Describe control account or work packages, briefly describe performance to date				5 minutes
No.	Title	Budget at completion	% complete	BCWP method	Discuss?
Step 4	Evaluate baseline for each work package				90 minutes
Work scope All work included? Clear work description? Risk mitigation? Technical risk? Trace from scope of work to WBS to control account or work package descriptions		Schedule Realistic? Complete? Subcontractors? Task durations? Network logic? Handoffs? Vertical and horizontal integration? Critical path? Concurrence? Developing schedule variance? Completion variance from schedule? Budget risk?		Budget Basis for estimate? Management challenges? Realistic budget? (focus on hours) Phasing? Developing cost variance? Variance at complete? Budget risk?	
Documents to review Statement of work, contractor WBS dictionary, work package descriptions, risk plans		Documents to review IMS, work package schedules, staffing plans		BCWP method Objective measures of work? Level of effort minimized? Subcontractor performance? Milestones defined? Method for calculating percentage complete?	
Documents to review Control account plan, basis of estimate, variance reports, purchase order for material		Documents to review Control account plan, back-up worksheets for BCWP, subcontractor reports		Documents to review Control account plan, back-up worksheets for BCWP, subcontractor reports	
Step 5	Document. Complete control account risk evaluation sheet, reach concurrence on risk and action items.				10 minutes

STEP 6: Develop the performance measurement baseline

❑ The performance measurement baseline

- ❖ Represents the **cumulative value** of the **planned work over time**.
- ❖ It considers we have an **appropriate schedule** with **finite resources**, and with **budgets** representing those **resources spread over time**.
- ❖ **Deviations** from the baseline identify **areas** where **management should focus** attention.

STEP 6: Develop the performance measurement baseline

- ❑ The performance measurement baseline **includes**
 - ❖ **Direct costs** associated with the **authorized work**.
 - ❖ **Project overhead**, if **allocated** to the **authorized work**
 - ✓ Overheads that directly applied should be considered such as material handling
 - ✓ *The problem is that the project overhead does not occur necessarily when direct costs occur*
 - ❖ Any **undistributed budget**, used as a short-term holding account for new work **until** it has been **planned in detail and distributed** to a **particular control account**.

You should be very careful when reading GAO

Why?

STEP 6: Develop the performance measurement baseline

Contingency

In this *Cost Guide*, contingency represents funds held at or above the government program office for “unknown unknowns” that are outside a contractor’s control. In this context, contingency funding is added to an estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows are likely to result in additional costs.

Management reserve (MR)

Management reserve funds are for “known unknowns” that are tied to a contract’s scope and managed at the contractor level. Unlike contingency, which is funding related, management reserve is budget related. The value of the contract includes these known unknowns in the budget base, and the contractor decides how much money to set aside.

⁵For our purposes in this *Cost Guide*, contingency represents funds held at or above the government program office for “unknown unknowns” that are outside a contractor’s control. In this context, contingency funding is added to an estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows are likely to result in additional costs. Management reserve funds, in contrast, are for “known unknowns” that are tied to the contract’s scope and managed at the contractor level. Unlike contingency, which is funding related, management reserve is budget related. The value of the contract includes these known unknowns in the budget base, and the contractor decides how much money to set aside. We recognize that other organizations may use the terms differently.

In this definition, GAO has assumed no management reserve for contractor and the definition of MR means the same contingency for contractors!

STEP 6: Develop the performance measurement baseline

- ❑ The performance measurement baseline does **not include**
 - ❖ General overhead
 - ❖ Management reserve (or contingency in GAO)

HOW ABOUT CONTINGENCY (OR MANAGEMENT RESERVE IN GAO)?

Next session is very very very important!

DO NOT MISS IT FROM THE OUTSET!

موسسه مهندسی و مدیریت ساخت علوی پور (ACEMI)

دفتر آموزش

تهران، بلوار فردوس شرق، مجتمع آبگینه، طبقه سوم اداری، واحد C42



+۹۸ ۲۱ ۴۶ ۱۰۰ ۴۴۵



+۹۸ ۲۱ ۴۶ ۱۰۰ ۴۵۰



info@dralavipour.com



www.dralavipour.com



@alavipour_pm



@acemi_social



@alavipour_pm



@IRANACEMI

