



# **PROJECT MONITORING & CONTROLLING**

**INCLUDES PROJECT CLOSING**



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# MONITORING & CONTROLLING PROCESSES

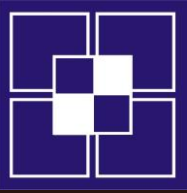
# Project Monitoring & Controlling Processes

1. Monitor and Control Project Work
2. Perform Integrated Change Control
3. Control Scope
4. Control Schedule
5. Control Costs
6. Control Quality
7. **Control Resources**
8. **Monitor Communications**
9. **Monitor Risks**
10. Control Procurements
11. **Monitor Stakeholder Engagement**
12. Validate Scope



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# **MONITOR AND CONTROL PROJECT WORK**



- The monitor and control project work process is concerned with:
  - a. Comparing actual project performance against the project management plan;
  - b. Assessing performance periodically to determine whether any corrective or preventive actions are indicated, and then recommending those actions as necessary;
  - c. Checking the status of individual project risks;
  - d. Maintaining an accurate, timely information base concerning the project's product(s) and their associated documentation through project completion;



- e. Providing information to support status reporting, progress measurement, and forecasting;
- f. Providing forecasts to update current cost and current schedule information;
- g. Monitoring implementation of approved changes as they occur;
- h. Providing appropriate reporting on project progress and status to program management when the project is part of an overall program; and
- i. Ensuring that the project stays aligned with the business needs.

# Monitor And Control Project Work: Inputs

1. .1 Project management plan
2. .2 Project documents
  - • Assumption log
  - • Basis of estimates
  - • Cost forecasts
  - • Issue log
  - • Lessons learned register
  - • Milestone list
  - • Quality reports
  - • Risk register
  - • Risk report
  - • Schedule forecasts
3. Work performance information
4. Agreements
5. Enterprise environmental factors
6. Organizational process assets



# Monitor And Control Project Work: Tools And Techniques

1. Expert judgment
2. Data analysis
  - Alternatives analysis
  - Cost-benefit analysis
  - Earned value analysis
  - Root cause analysis
  - Trend analysis
  - Variance analysis
3. Decision making
4. Meetings





# Monitor And Control Project Work: Outputs

1. Work performance reports
2. Change requests
3. Project management plan updates
4. Project documents updates
  - Cost forecasts
  - Issue log
  - Lessons learned register
  - Risk register
  - Schedule forecasts



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# **Perform Integrated Change Control**

# Perform Integrated Change Control: Inputs

1. Project management plan
  - Change management plan
  - Configuration management plan
  - Scope baseline
  - Schedule baseline
  - Cost baseline
2. Project documents
  - Basis of estimates
  - Requirements traceability matrix
  - Risk report
3. Work performance reports
4. Change requests
5. Enterprise environmental factors
6. Organizational process assets



# Perform Integrated Change Control: Tools & Techniques

1. Expert judgment
2. Change control tools
3. Data analysis
  - Alternatives analysis
  - Cost-benefit analysis
4. Decision making
  - Voting
  - Autocratic decision making
  - Multi-criteria decision analysis
5. Meetings



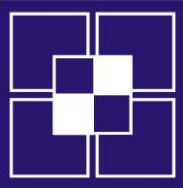
# Perform Integrated Change Control: Outputs

1. Approved change requests
2. Project management plan updates
3. Project documents updates
  - Change log



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# Control Scope



# Control Scope

## Inputs

1. Project management plan
2. Work performance data

## Tools & Techniques

1. Data analysis
  - Variance analysis
  - Trend analysis

## Outputs

1. Work performance information
2. Change requests



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# Control Schedule





# Control Schedule

## Inputs

1. Project management plan
2. Work performance data

## Tools & Techniques

1. Data analysis
  - Earned value analysis

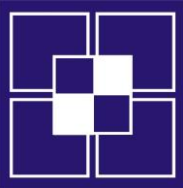
## Outputs

1. Work performance information
2. Change requests



# Control Schedule: Inputs

1. Project management plan
  - Schedule management plan
  - Schedule baseline
  - Scope baseline
  - Performance measurement baseline
2. Project documents
  - Lessons learned register
  - Project calendars
  - Project schedule
  - Resource calendars
  - Schedule data
3. Work performance data
4. Organizational process assets



# Control Schedule: Tools & Techniques

1. .I Data analysis
  - Earned value analysis
2. Project management information system
3. Resource optimization
4. Leads and lags
5. Schedule compression

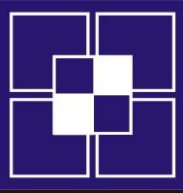
# Control Schedule: Outputs

1. Work performance information
2. Schedule forecasts
3. Change requests
4. Project management plan updates
  - Schedule management plan
  - Schedule baseline
  - Cost baseline
  - Performance measurement baseline
5. Project documents updates
  - Assumption log
  - Basis of estimates
  - Lessons learned register
  - Project schedule
  - Resource calendars
  - Risk register
  - Schedule data



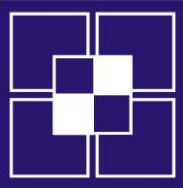
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# Control Costs



# Control Costs: Inputs

1. Project management plan
  - Cost management plan
  - Cost baseline
  - Performance measurement baseline
2. Project documents
  - Lessons learned register
3. Project funding requirements
4. Work performance data
5. Organizational process assets



# Control Costs: Tools And Techniques

1. Expert judgment
2. Data analysis
  - Earned value analysis
  - Variance analysis
  - Trend analysis
  - Reserve analysis
3. To-complete performance index (TCPI)
4. Project management information system

# Control Costs: Outputs

1. Work performance information
2. Cost forecasts
3. Change requests
4. Project management plan updates
  - • Cost management plan
  - • Cost baseline
  - • Performance measurement baseline
5. Project documents updates
  - • Assumption log
  - • Basis of estimates
  - • Cost estimates
  - • Lessons learned register
  - • Risk register



# EARNED VALUE MANAGEMENT (EMV)

Name	Formula	What it says	Why you use it
<b>BAC—Budget at Completion</b>	No formula – it's the project budget	How much money you'll spend on the project	To tell the sponsor the total amount of value that he's getting for the project
<b>PV—Planned Value</b>	$PV = BAC \times \frac{\text{Planned \% Complete}}{100}$	What your schedule says you should have spent	To figure out what value your plan says you should have delivered so far
<b>EV—Earned Value</b>	$EV = BAC \times \frac{\text{Actual \% Complete}}{100}$	How much of the project's value you've really earned	EV lets you translate how much work the team's finished into a dollar value
<b>AC—Actual Cost</b>	What you've actually spent on the project	How much you've actually spent so far	The amount of money you spend doesn't always match the value you get!
<b>SPI—Schedule Performance Index</b>	$SPI = \frac{EV}{PV}$	Whether you're behind or ahead of schedule	To figure out whether you've delivered the value your schedule said you would
<b>SV—Schedule Variance</b>	$SV = EV - PV$	How much ahead or behind schedule you are	This puts a dollar value on exactly how far ahead or behind schedule you are
<b>CPI—Cost Performance Index</b>	$CPI = \frac{EV}{AC}$	Whether you're within your budget or not	Your sponsor is always most interested in the bottom line!
<b>TCPI—To-Complete Performance Index</b>	$TCPI = \frac{BAC - EV}{BAC - AC}$	How well your project must perform to stay on budget.	This will let you forecast whether or not you can stick to your budget.
<b>CV—Cost Variance</b>	$CV = EV - AC$	How much above or below your budget you are	Your sponsor needs to know how much it costs to get him the value you deliver

# Case I



- \*You're managing a project to analyse 200 new tomato paste products in Nigeria and you need to figure out your budget. Each week of the project costs the same: your team members are paid a total of N400,000 every week, and you need N100,000 worth of materials each week to do the work. If the project is scheduled to last 16 weeks,
- what's the BAC for the project?
- What will the Planned % Complete be four weeks into the project?
- What should the PV be four weeks into the project?
- You've checked with your team, but they have bad news. The schedule says they were supposed to have analysed 50 new tomato pastes by now, but they only analysed 40.
  - Can you figure out the actual % complete?
  - What should the Earned Value be right now?


- $BAC = 400,000 + 100,000 = N500,000/wk$
- $Duration = 16$
- $BAC = N500,000 \times 16 = N8,000,000$
  
- $P\%C = 4/16 \times 100 = 25\%$
- $PV = BAC \times P\%C = 8,000,000 \times 25\%$
- $PV = N2,000,000$
- $A\%C = 40/200 \times 100 = 20\%$
- $EV = BAC \times A\%C = 8,000,000 \times 20\%$
- $EV = N1,600,000$


## Case 2


- \*\*Your project has a total budget of \$300,000. You check your records and find that you've spent \$175,000 so far. The team has completed 40% of the project work, but when you check the schedule it says that they should have completed 50% of the work. Calculate the following:
- BAC, AC, PV, EV, SV, CV, SPI, CPI




- $BAC = \$300,000$
- $AC = \$175,000$
- $PV = BAC \times P\%C \text{ (} P\%C = 50\% \text{)}$
- $PV = 300,000 \times 50\% = 150,000 \text{ usd}$
- $EV = BAC \times A\%C \text{ (} A\%C = 40\% \text{)}$
- $EV = 300000 \times 40\% = 120,000 \text{ usd}$
- $SV = EV - PV = 120,000 - 150,000 = -30,000 \text{ usd}$
- $CV = EV - AC = 120000 - 175000 = -55000 \text{ usd}$
- $SPI = EV/PV = 120000/150000 = 0.8$
- $CPI = EV / AC = 120000/175000 = 0.69$

- 
- . When your  $SV$  is zero. You are on schedule.
  - When your  $SV$  is negative, you are behind schedule
  - Where your  $SV$  is positive, you are ahead of schedule.

- 
- When your CV is zero, you are on budget.
  - when your CV is negative, you are ahead of budget.
  - We your CV is positive, it means You are running below budget.
  -

- 
- when your SPI is less than one, you're behind schedule.
  - when your SPI is one, you're on schedule.
  - When your SPI is above 1, you're ahead of schedule.



- 
- When CPI is one, you're on budget.
  - When it is more than one, it means you're running below budget.
  - When it less than one, it means you are running above budget.

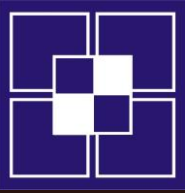
## Case 3

- A project has budget (value) of N100,000,000 and month six represents 50% of the project work scheduled to be done. However the work completed to date represent 25% of the entire project work, and amount of monies the project has required to date is N35,000,000. Determine the health (status) of the project



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# Control Quality



# Control Quality: Inputs

1. Project management plan
  - Quality management plan
2. Project documents
  - Lessons learned register
  - Quality metrics
  - Test and evaluation documents
3. Approved change requests
4. Deliverables
5. Work performance data
6. Enterprise environmental factors
7. Organizational process assets



# Perform Quality Control: Tools & Techniques.

## 1. Data gathering

- Checklists
- Check sheets
- Statistical sampling
- Questionnaires and surveys

## 2. Data analysis

- Performance reviews
- Root cause analysis

## 3. Inspection

## 4. Testing/product evaluations

## 5. Data representation

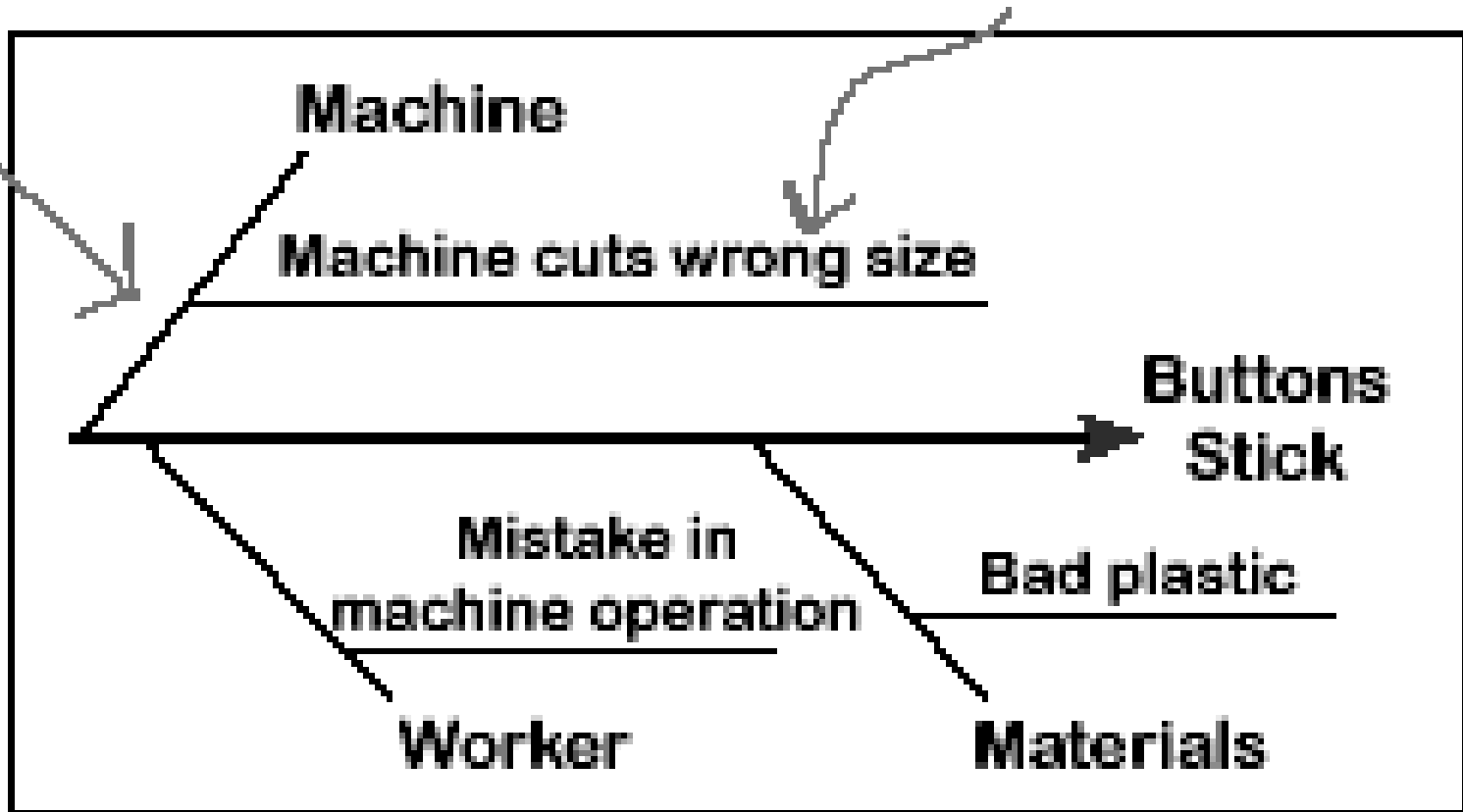
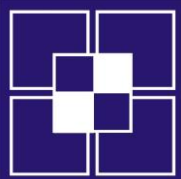
- Cause-and-effect diagrams
- Control charts

## 6. Meetings



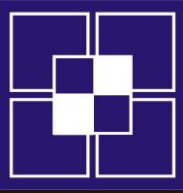
<b>Defects/Date</b>	<b>Date 1</b>	<b>Date 2</b>	<b>Date 3</b>	<b>Date 4</b>	<b>Total</b>
Small scratch	1	2	2	2	7
Large scratch	0	1	0	0	1
Bent	3	3	1	2	9
Missing component	5	0	2	1	8
Wrong color	2	0	1	3	6
Labeling error	1	2	1	2	6

## Check Sheets



## Fishbone or Ishikawa Diagram

- Horizontal lines show the root causes you've found for each category.
- The vertical "fishbone" lines are categories to help you find and organize the root causes of defects.



# Quality Control: Outputs

1. Quality control measurements
2. Verified deliverables
3. Work performance information
4. Change requests
5. Project management plan updates
  - Quality management plan
6. Project documents updates
  - Issue log
  - Lessons learned register
  - Risk register
  - Test and evaluation documents



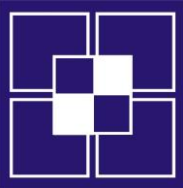


# **Control Resources**



# Control Resources: Inputs

1. Project management plan
  - Resource management plan
2. Project documents
  - Issue log
  - Lessons learned register
  - Physical resource assignments
  - Project schedule
  - Resource breakdown structure
  - Resource requirements
  - Risk register
3. Work performance data
4. Agreements
5. Organizational process assets



# Control Resources: Tools & Techniques

1. .I Data analysis
  - Alternatives analysis
  - Cost-benefit analysis
  - Performance reviews
  - Trend analysis
2. Problem solving
3. Interpersonal and team skills
  - Negotiation
  - Influencing
4. Project management information system



# Control Resources: Tools & Techniques

1. Work performance information
2. Change requests
3. Project management plan updates
  - Resource management plan
  - Schedule baseline
  - Cost baseline
4. Project documents updates
  - Assumption log
  - Issue log
  - Lessons learned register
  - Physical resource assignments
  - Resource breakdown structure
  - Risk register



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# **Monitor Communications**

# Monitor Communications: Inputs

1. Project management plan
  - Communications management plan
  - Stakeholder engagement plan
2. Project documents
  - Issue log
  - Lessons learned register
  - Project communications
3. Work performance data
4. Enterprise environmental factors
5. Organizational process assets

# Monitor Communications: Tools and Techniques

1. Expert judgment
2. Project management information system
3. Data analysis
  - Stakeholder engagement assessment matrix
4. Interpersonal and team skills
  - Observation/conversation
5. Meetings



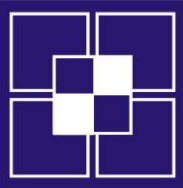
# Monitor Communications: Outputs

1. Work performance information
2. Change requests
3. Project management plan updates
  - Communications management plan
  - Stakeholder engagement plan
4. Project documents updates
  - Issue log
  - Lessons learned register
  - Stakeholder register



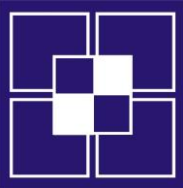


# Monitor Risks



# Monitor Risks: Inputs

1. Project management plan
  - Risk management plan
2. Project documents
  - Issue log
  - Lessons learned register
  - Risk register
  - Risk report
3. Work performance data
4. Work performance reports



# Monitor Risks: Tools & Techniques

1. Data analysis
  - Technical performance analysis
  - Reserve analysis
2. Audits
3. Meetings



# Monitor Risks: Outputs

1. Work performance information
2. Change requests
3. Project management plan updates
4. Project documents updates
  - Assumption log
  - Issue log
  - Lessons learned register
  - Risk register
  - Risk report
5. Organizational process assets updates



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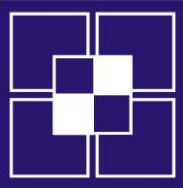
# **Control Procurements**



# Control Procurements: Inputs

- **Project management plan**
  - Requirements management plan
  - Risk management plan
  - Procurement management plan
  - Change management plan
  - Schedule baseline

- **Project documents**
  - Assumption log
  - Lessons learned register
  - Milestone list
  - Quality reports
  - Requirements documentation
  - Requirements traceability matrix
  - Risk register
  - Stakeholder register



# Control Procurements: Inputs

3 Agreements

.4 Procurement documentation

.5 Approved change requests

.6 Work performance data

.7 Enterprise environmental factors

.8 Organizational process assets



# Control Procurements: Tools & Techniques

1. Expert judgment
2. Claims administration
3. Data analysis
  - Performance reviews
  - Earned value analysis
  - Trend analysis
4. Inspection
5. Audits





# Control Procurements: Outputs

1. Closed procurements
2. Work performance information
3. Procurement documentation updates
4. Change requests
5. Project management plan updates
  - Risk management plan
  - Procurement management plan
  - Schedule baseline
  - Cost baseline

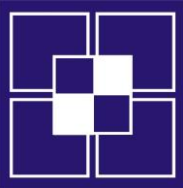
## 6. Project documents updates

- Lessons learned register
- Resource requirements
- Requirements traceability matrix
- Risk register
- Stakeholder register

## 7. Organizational process assets updates



# **Monitor Stakeholder Engagement**



# Monitor Stakeholder Engagement: Inputs

1. Project management plan
  - Resource management plan
  - Communications management plan
  - Stakeholder engagement plan
2. Project documents
  - Issue log
  - Lessons learned register
  - Project communications
  - Risk register
  - Stakeholder register
3. Work performance data
4. Enterprise environmental factors
5. Organizational process assets

# Monitor Stakeholder Engagement: Tools & Techniques

## 1. Data analysis

- Alternatives analysis
- Root cause analysis
- Stakeholder analysis

## 2. Decision making

- Multi-criteria decision analysis
- Voting

## 3. Data representation

- Stakeholder engagement assessment matrix

## 4. Communication skills

- Feedback
- Presentations

## 5. Interpersonal and team skills

- Active listening
- Cultural awareness
- Leadership
- Networking
- Political awareness

## 6. Meetings



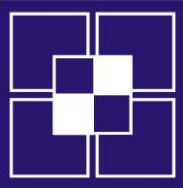
# Monitor Stakeholder Engagement: Outputs

1. Work performance information
2. Change requests
3. Project management plan updates
  - Resource management plan
  - Communications management plan
  - Stakeholder engagement plan
4. Project documents updates
  - Issue log
  - Lessons learned register
  - Risk register
  - Stakeholder register



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# Validate Scope



# Validate Scope: Inputs

1. Project management plan
  - Scope management plan
  - Requirements management plan
  - Scope baseline
2. Project documents
  - Lessons learned register
  - Quality reports
  - Requirements documentation
  - Requirements traceability matrix
3. Verified deliverables
4. Work performance data



# Validate Scope: Tools And Techniques

1. Inspection
2. Decision making
  - Voting





# Validate Scope: Outputs

1. Accepted deliverables
2. Work performance information
3. Change requests
4. Project document updates
  - Lessons learned register
  - Requirements documentation
  - Requirements traceability matrix



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# **PROJECT CLOSING**

**PROJECT MANAGEMENT PROFESSIONAL COURSE**



# Close Project or Phase



# The activities necessary for the administrative closure of the project or phase include:

- I. **Actions and activities necessary to satisfy completion or exit criteria for the phase or project such as:**
  - Making certain that all documents and deliverables are up-to-date and that all issues are resolved;
  - Confirming the delivery and formal acceptance of deliverables by the customer;
  - Ensuring that all costs are charged to the project;
  - Closing project accounts;
  - Reassigning personnel;
  - Dealing with excess project material;
  - Reallocating project facilities, equipment, and other resources; and
  - Elaborating the final project reports as required by organizational policies.

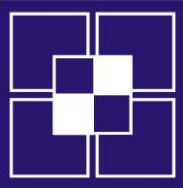


2. **Activities related to the completion of the contractual agreements applicable to the project or project phase such as:**
  - Confirming the formal acceptance of the seller's work,
  - Finalizing open claims,
  - Updating records to reflect final results, and
  - Archiving such information for future use.



### 3. **Activities needed to:**

- Collect project or phase records,
- Audit project success or failure,
- Manage knowledge sharing and transfer,
- Identify lessons learned, and
- Archive project information for future use by the organization.



4. Actions and activities necessary to transfer the project's products, services, or results to the next phase or to production and/or operations.
5. Collecting any suggestions for improving or updating the policies and procedures of the organization, and sending them to the appropriate organizational unit.
6. Measuring stakeholder satisfaction.



# Close Project Or Phase: Inputs

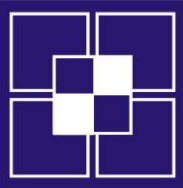
1. Project charter
2. Project management plan
3. Accepted deliverables
4. Business documents
  - Business case
  - Benefits management plan
5. Agreements
6. Procurement documentation
7. Organizational process assets



# Close Project Or Phase: Inputs

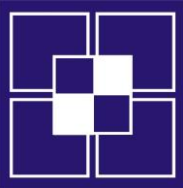
## 8. Project documents

- Assumption log
- Basis of estimates
- Change log
- Issue log
- Lessons learned register
- Milestone list
- Project communications
- Quality control measurements
- Quality reports
- Requirements documentation
- Risk register
- Risk report



# Close Project Or Phase: Tools & Techniques

1. Expert judgment
2. Data analysis
  - Document analysis
  - Regression analysis
  - Trend analysis
  - Variance analysis
3. Meetings



# Close Project Or Phase: Outputs

1. Project documents updates
  - Lessons learned register
2. Final product, service, or result transition
3. Final report
4. Organizational process assets updates

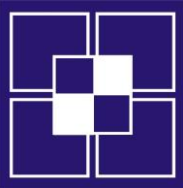


## Keep In Mind!!

- The most important output of the Close Project or Phase is the final product that you deliver to the project sponsor!

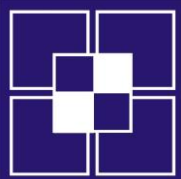


# Project Ends



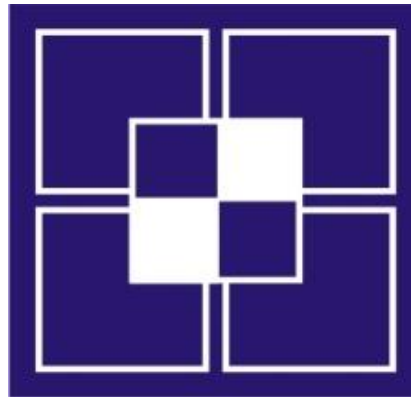
# References

- Project Management Body Of Knowledge (PMBOK-6)
- Oreilly Head First PMP, 2nd Edition
- Project Management Professional Exam Guide, 5th Edition



THANK  
YOU





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