Project Management

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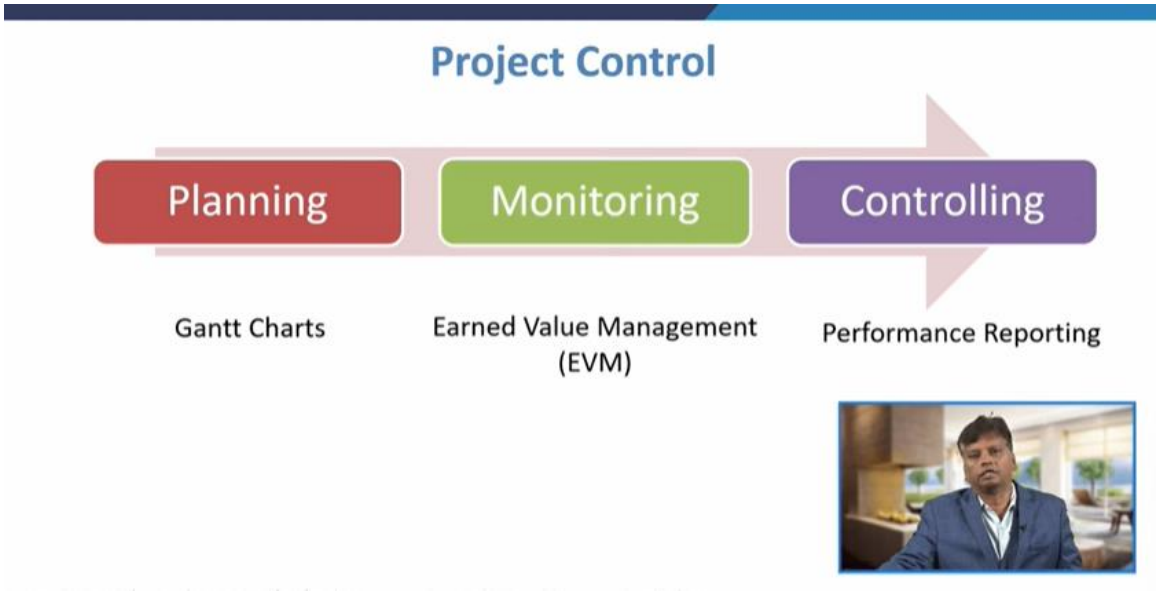
Week: 7

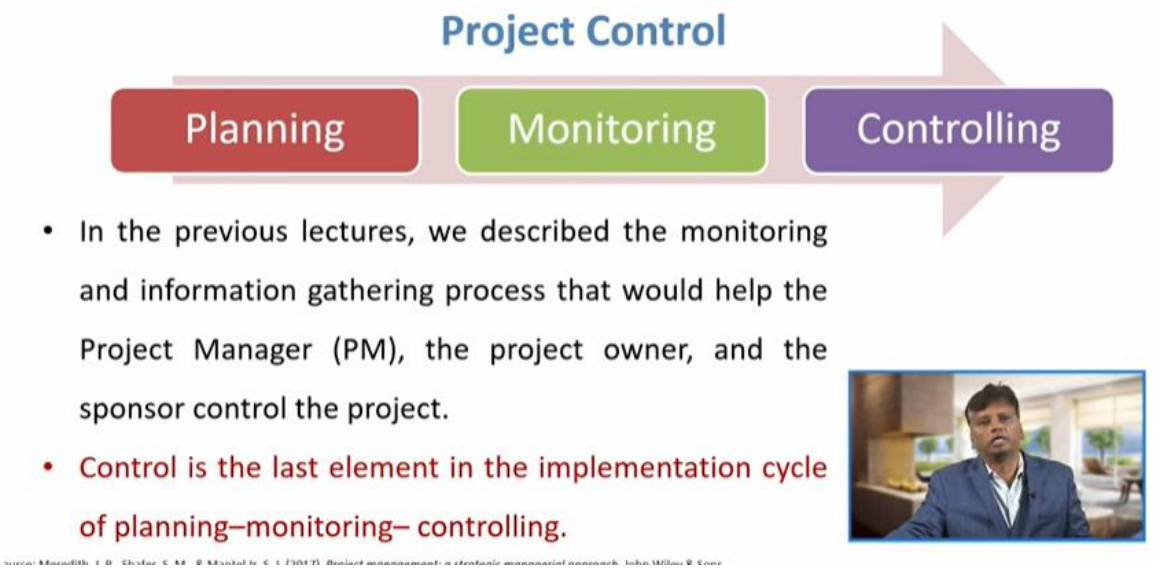
Lecture 31-Three types of Project Controlling

Dear students, today we are discussing about project controlling. We are going to discuss about three types of controlling the project. So, in the previous class, I have discussed about some of the agile tools for tracking the project, this topic. So, now I am discussing about three types of project controlling techniques. So, the agenda for this lecture is, what is the project control, then importance of physical asset control, human resource control and finance resource control, then three types of control process. The first type is cybernetic control, the second one is go, no go control, the third one is the post control.

So, this controlling is the third activity in our planning monitoring control activities. Previously, in my lectures, we discussed about various methods for planning the project. For example, one tool is the Gantt chart, then we discussed about the monitoring the project. So, the value management is one of the way of monitoring the project.



So, once we monitor the project, if there is a difference what we have expected and what is actual, so that is done by with the help of this controlling technique, like by creating a performance report. So, what is the deviation? That can be if there is a deviation that has to be corrective action need to be taken to minimize the deviation. So, that is the main purpose of this project control. So, in the previous lecture, we described the monitoring and information gathering process that would help the project manager, the project owner and the sponsor for controlling the project. So, control is the last element in the implementation cycle of planning, monitoring and controlling.



Project Control

- Information is collected about system performance, compared with the desired (or planned) level, and action taken if actual and desired performance differ enough that the controller (manager) wishes to decrease the difference.

Now, we will discuss about project control. So, information is collected about system performance and compared with the desired level and action taken if the actual and desired performance differ enough that the controller, especially the manager wishes to decrease the difference. So, what we see? We see what is planned and what is the actual one, if there is a difference, then the project manager has to take some action. Note that reporting performance, comparing the difference between desired and actual performance levels and accounting for why such differences exist are all part of the control process. So, control is the main purpose of control is the act of reducing the difference between plan and reality.

Project Control

- Note that reporting performance, comparing the differences between desired and actual performance levels, and accounting for why such differences exist are all parts of the control process.

Control is the act of reducing the difference between plan and reality.

Project Control

- Control is focused on three elements of a project—scope, cost, and time.
- The PM is constantly concerned with these three aspects of the project.
  - Is the project delivering what it promised to deliver, or more?
  - Is it making delivery at or below the promised cost?
  - Is it making delivery at or before the promised time?
  - It is strangely easy to lose sight of these fundamental targets, especially in large projects with a wealth of detail and a great number of subprojects.

So, control is focused on three element of the project. We can control on scope, we can control on cost, we can control on time. So, the project manager is constantly concerned with these three aspects of the project like is the project delivering what it promised to deliver or more, then is it making delivery or yet to below the promised cost, is making delivery at the before the promised time, it is strangely easy to loss sight of these fundamental targets, especially in large projects with a wealth of detail and a great number of sub projects. So, large projects develop their own momentum and tend to get out of the hand, going their own way independent of wishes of the project manager and the intent of the proposal. So, if there is a large project, if it is not properly controlled, it will go after the project manager control that that will create a lot of problem for us.

Project Control

- Large projects develop their own momentum and tend to get out of hand, going their own way independent of the wishes of the PM and the intent of the proposal.

Project Control

Think of a few things that can cause a project to require the control of scope,

Scope

- Unexpected technical problems arise.
- Insurmountable technical difficulties are present.
- Quality or reliability problems occur.
- Client requires changes in system specifications.
- Interfunctional complications and conflicts arise.
- Technological breakthroughs affect the project.

Now think of the few things that can cause a project to require control of the process like with respect to scope, we have to do some controlling process, what are the symptoms that things are going out of our scope. So, there may be unexpected technical problem arise that reason is that we are exceeding the scope and insurmountable technical difficulties are present, then quality and reliability problem occurs, client requires changes in system specifications, inter functional complications and conflict arise, technological breakthrough affect the project. So, these are the symptoms of there is a to know that there is a need to control on scope, if the scope is not controlled, these are the symptom may arise. Now next very important thing is cost. So, what are the symptoms? Technical difficulties require more resources, scope of work increases, these are the symptoms that we need to that is forcing us to we have need to control on the cost.

Project Control

Cost

- Technical difficulties require more resources.
- The scope of the work increases.
- Initial bids or estimates were too low.
- Reporting was poor or untimely.
- Budgeting was inadequate.
- Corrective control was not exercised in time.

Project Control

Time

- Technical difficulties took longer than planned to solve.
- Initial time estimates were optimistic.
- Task sequencing was incorrect.
- Required inputs of material, personnel, or equipment were unavailable when needed.
- Necessary preceding tasks were incomplete.

Source: Meredith, J. R., Shafer, S. M., & Mantel Jr, S. J. (2017). *Project management: a strategic managerial approach*. John Wiley & Sons.

Then initial bids or estimates were too low, reporting was poor or untimely, budgeting was inadequate, corrective control was not exercised in time. So, these are the symptoms that is giving a hint that we need to do the proper cost control. The next one is a time, technical difficulties took longer than planned to solve, initial time estimates were optimistic, task sequencing was incorrect, required input of materials, personnel or equipment were unavailable when needed, necessary preceding task were incomplete. So, these are the symptoms that is hinting us that we have to have a control on time. So the fundamental purpose of control, so the two fundamental objective of control are as follows, one is the regulation of result through alteration of activities.

The Fundamental Purposes of Control

- The two fundamental objectives of control are as follows:

The regulation of results through the alteration of activities.

The stewardship of organizational assets.

So if there is a deviation, then we can go for controlling, so what we will do in controlling we can regulate the result through alteration of activities, then the stewardship of organizational assets, so the responsibility you have to own our organizational asset, so

that you will properly, you will appropriately use the resources. So when we say the manager has to control the physical asset control, so there will be physical asset we need to have a control on this physical asset. So physical asset control require control of use of physical assets, it is concerned with asset maintenance whether preventive or corrective, at issue also the timing of the maintenance or replacement as well as the quality of maintenance also important. So as a project manager he has to control of the physical asset, then he has to control on human resource, then he has to control on financial resource, so these three very important asset a project manager has to control that. So physical inventory whether equipment or material must be controlled, it must be received, inspected or certified and possibly stored prior to use.

Physical Asset Control

- Physical asset control requires control of the use of physical assets.
- It is concerned with asset maintenance, whether preventive or corrective.
- At issue, also is the timing of maintenance or replacement as well as the quality of maintenance.

Physical Asset Control

- Physical inventory, whether equipment or material, must also be controlled.
- It must be received, inspected (or certified), and possibly stored prior to use.
- Records of all incoming shipments must be carefully validated so that payment to suppliers can be authorized

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Records of all incoming shipments must be carefully validated, so that payment to suppliers can be authorized. The next type of resource is human resource that need to be controlled, so stewardship of human resource requires controlling and maintaining the

growth and development of the people because the human itself a human capital we say it is not that material money the human also capital that need to be properly controlled and has to be developed. So projects provide particularly fertile ground for cultivate the people because projects are unique differing one from another in many ways it is possible for people working on projects to gain a wide range of experience in a reasonably shorter time. The third one is a financial control, the techniques of financial control both conservation and regulation are well known, they include current asset controls and project budget as well as capital investment control. These controls are exercised through a series of analysis and audits conducted by the accounting controller function for the most part.

Human Resource Control

- Stewardship of human resources requires controlling and maintaining the growth and development of people.
- Projects provide particularly fertile ground for cultivating people.

Human Resource Control

- Because projects are unique, differing one from another in many ways, it is possible for people working on projects to gain a wide range of experience in a reasonably short time.

Financial Resource Control

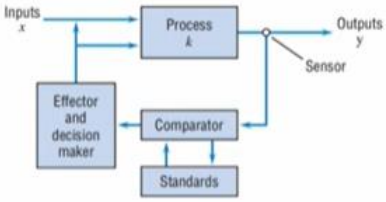
- The techniques of financial control, both conservation and regulation, are well known.
- They include current asset controls, and project budgets as well as capital investment controls.

Representation of this function on the project team is mandatory. Now we will talk about our title of this lecture, three types of control mechanism. So beyond this time we are going to talk about three types one is the cybernetic control, second one is go no go control, third one is the post control. What is cybernetic control? So cybernetic or steering control is by the far the most common type of control system. The key feature of cybernetic control is its automatic operation.

Three Types of Control mechanism

Cybernetic Control

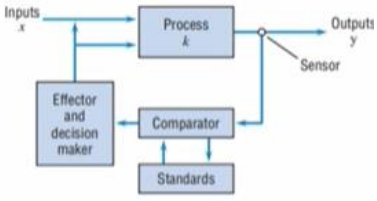
- **Cybernetic**, or steering, control is by far the most common type of control system.
- The key feature of cybernetic control is its automatic operation.
- Consider the diagrammatic model of a cybernetic control system shown in Figure



Consider the diagrammatic model of a cybernetic control system shown in this figure. So there is a input is there, there is a output is there, there is a sensors which sends the output, then it is given to the comparator, it compares with the standards. If there is a difference, there is an effector and decision maker, he will do the modification. So this is the process of cybernetic control. This figure shows a system is operating with inputs being subjected to a process that transform them into output.

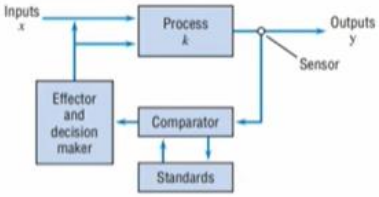
Cybernetic Control

- As Figure shows, a system is operating with inputs being subjected to a process that transforms them into outputs.
- It is this system that we wish to control.
- In order to do so, we must monitor the system output.
- This function is performed by sensors that measure one or more aspects of the output, presumably those aspects one wishes to control.



Cybernetic Control

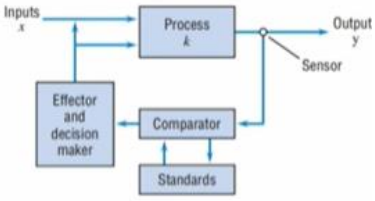
- Measurements taken by a sensor are transmitted to the comparator, which compares them with a set of predetermined standards.
- The difference between actual and standard is sent to the decision maker, which determines whether or not the difference is of sufficient size to deserve correction.



It is this system that we wish to control. In order to do so, we must monitor the system output. So the function is performed by sensors that measures one or more aspects of the output presumably those aspects one wish to control. Measurement taken by a sensor or transmitter to the comparator which compares them with the set of predetermined standards. So the difference between actual and standard is sent to the decision maker which determines whether or not the difference is sufficient size to deserve correction.

Cybernetic Control

- If the difference is large enough to warrant action, a signal is sent to the effector, which acts on the process or on the inputs to produce outputs that conform more closely to the standard



If the difference is large enough to warrant action, a signal is sent to the effector which act on the process or on the input to produce the output that conform more closely to the standard. A cybernetic control system that act to reduce deviations from standard is called a negative feedback loop. With the system output to move away from standard in one direction, the control mechanism act to move it into the opposite direction. The speed or force with which the control operate is proportional to the size of the deviation from the standard. Then what are the information required for this cybernetic controllers.

Information Requirements for Cybernetic Controllers

- In order to establish total control over a system, the controller must be able to take a counteraction for every action the system can take .
- For complex systems, particularly those containing a human element, this is simply not possible.
- Thus, we need a strategy to aid the PM in developing a control system.

In order to establish total control over the system, the controller must be able to take counter action for every action the system can take. For complex system particularly those containing a human element this is simply not possible because there are more chance for bias, there is a more chance for human error. Thus we need a strategy to aid the project manager in developing a control system. One such strategy is to use cost benefit approach to control that is to control those aspect of the system for which the expected benefits of control are greater than the expected cost. So the benefit is less, but the cost is more, then we need to go for control system.

Information Requirements for Cybernetic Controllers

- One such strategy is to use a cost/benefit approach to control—to control those aspects of the system for which the expected benefits of control are greater than the expected costs.
- However, relatively few elements of a project (as opposed to the elements of a system that operates more or less continuously) are subject to automatic control.

However, relatively few elements of a project as opposed to the element of a system that operates more or less continuously are subject to automatic control. So the whole project activities cannot be automatically controlled. So only few element of the project can be controlled automatically. The next type of control is called go no go control. So go no go control take the form of testing to see if some specific precondition has been met.

Go/No-Go Controls

- **Go/no-go controls** take the form of testing to see if some specific precondition has been met.
- Most of the control in project management, if it exists at all, falls into this category.
- This type of control can be used on almost every aspect of a project.

Most of the control in project management if it exist at all fall into this category. So this type of control can be used on almost every aspect of your project. For many facets of the project scope, cost and time it is sufficient to know that the predetermined specification have been met. Certain characteristics of output may be required to fall within precisely determined limits if the output is to be accepted by the client. In regard to time and cost there may be penalties associated with non-conformance with the approved plan.

Go/No-Go Controls

- In regard to time and cost, there may be penalties associated with nonconformance with the approved plans.
- Penalty clauses that make late (or too early) delivery costly for the producer are often included in the project contract.
- Cost overruns may be shared with the client or borne by the project.

So penalty classes that make late delivery costly for the producer are often included in the project contract. So cost overrun may be shared with the client or borne by the project. Some contracts arrange for a X dollar of the cost overrun to be shared by the client and producer with any further overrun being the producer's responsibility. The number and type of go no go controls on a project are limited only by the imagination and the desire of contracting parties. Go no go controls operate only when and if the controller uses them.

Go/No-Go Controls

- Some contracts arrange for the first $X of cost overrun to be shared by client and producer, with any further overrun being the producer's responsibility.
- The number and type of go/no-go controls on a project are limited only by the imagination and desire of the contracting parties.

In many cases go no go controls function periodically at regular preset intervals. The intervals are usually determined by clock, calendar or the operating cycles of some machine system. Such periodicity makes it easy to administer a control system but it often allow errors to be compounded before they are detected. So controlling can be done monthly or weekly or certain business cycles. So when we do that here some errors are getting accumulated until we detect that error.

Go/No-Go Controls

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- The intervals are usually determined by clock, calendar, or the operating cycles of some machine system.
- Such periodicity makes it easy to administer a control system, but it often allows errors to be compounded before they are detected

Information Requirements for Go/No-Go Controls

- The project proposal, plans, specifications, schedules, and budgets (complete with approved change orders) contain all the information needed to apply go/no-go controls to the project.
- Milestones are often key events that serve as a focus for ongoing control activity.

Next we will see what are the informations required for go no go control. The project proposal, plan, specifications, schedule and budgets contain all the information needed to apply go no go control to the project. Milestones are often key event that serve as a focus for ongoing control activity whether the milestone is achieved or not achieved that is why go no go. So these milestones are the projects deliverable in the form of in process output or final output. If the milestone occurs on time, on budget and at the planned level of quality the project manager and the senior management can take comfort from the fact that things are proceeding properly.

Information Requirements for Go/No-Go Controls

- These milestones are the project's deliverables in the form of in-process output or final output.
- If the milestones occur on time, on budget, and at the planned level of quality, the PM and senior management can take comfort from the fact that things are proceeding properly.

Post control

- Post controls (also known as post performance controls or reviews, or post project controls or reviews) are applied after the fact.
- One might draw parallels between post control and "locking the barn after the horse has been stolen," but post control is not a vain attempt to alter what has already occurred.

The third type of control is post control. So post controls also known as post performance controls or reviews or post project controls or reviews are applied after the fact as soon as project is completed. One might draw a parallel between post control like locking the barn after the cars has been stolen but post control is not a vain attempt to alter what has already occurred. That is because we are doing analysis after the project is completed it is not the wasteful futile activities but we can learn many things after the project is completed when you do the post control. Now we will talk about the project objectives.

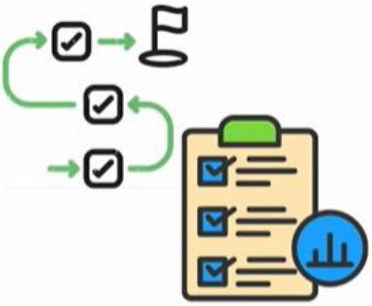
The Project Objectives

- The post-control report will contain a description of the objectives of the project.
- Usually, this description is taken from the project proposal, and the entire proposal often appears as an appendix to the post-control report.
- As reported here, project objectives include the effects of all change orders issued and approved during the project

The most controlled report will contain a description of objective of the project. Usually this description is taken from the project proposal and the entire proposal often appears an appendix to the post control report. As reported here the project objectives include the effect of all change orders issued and approved during the project. Now we will discuss about various milestones, gate and budgets. This section of the post control document starts with a full project performance report against the planned schedule and budget.

Milestones, Gates, and Budgets

- This section of the post-control document starts with a full project performance report against the planned schedule and budget.
- This can be prepared by combining and editing the various project status reports made during the project's life.



Milestones, Gates, and Budgets

- Significant deviations of actual schedule and budget from planned schedule and budget should be highlighted.
- Explanations of why these deviations occurred will be offered in the next section of the post-control report.

This can be prepared by combining and editing the various project status reports made during the project's life. Significant deviations of actual schedule and budget from planned schedule and budget should be highlighted. Explanation of why these deviations occurs will be offered in the next section of the project control report. Now we are discussing about the final report on project results. When significant variations of actual from planned project performance are indicated, no distinction should be made between favorable and unfavorable variations.

The Final Report on Project Results

- When significant variations of actual from planned project performance are indicated, no distinction should be made between favorable and unfavorable variations.

While this is a quite natural, it leads to a complete documentation on why some things went wrong and little or no documentation on why some things went particularly well. Both sides a good and bad should be chronicled here. So even though good things and bad things that has to be documented in the final project report. Now recommendations for performance and process improvement. So the culmination of post control report is a set of recommendations covering the ways that future projects can be improved.

The Final Report on Project Results

- While this is quite natural, it leads to complete documentation on why some things went wrong and little or no documentation on why some things went particularly well.
- Both sides, the good and the bad, should be chronicled here.

Recommendations for Performance and Process Improvement

- The culmination of the post control report is a set of recommendations covering the ways that future projects can be improved.
- Many of the explanations appearing in the previous slides are related to one-time happenings—sickness, weather, strikes, or the appearance of new technology—these are not apt to affect future projects, although other, different one-time events may affect them.

Recommendations for Performance and Process Improvement

- But some of the deviations from plan were caused by happenings that are very likely to recur.
- Examples of recurring problems might be a chronically late supplier, a generally noncooperative functional department, a habitually optimistic cost estimator, or a highly negative project team member.

Many of the explanations appearing in the previous slides are related to one time happening like sickness, weather, strike or the appearance of new technology. These are not apt to affect future projects although other different one time events may affect them. But some of the deviations from plan were caused by happening that are very likely to reoccur. Examples of recurring problem might be chronically late suppliers, a generally non-cooperative functional department, a habitually optimistic cost estimator or a highly negative project team member. Provision for such things can be factored into future project plan adding to predictability and control.

Recommendations for Performance and Process Improvement

- Provision for such things can be factored into future project plans, adding to predictability and control.
- This is risk identification and management in practice.
- We cannot over emphasise the importance of this section.

This is a risk identification and management in practice. So we cannot overemphasize the importance of this section. Dear students, in this lecture I have discussed about the project control. So three things a project manager has to focus on controlling like physical asset, human resource and financial resource. After that I discussed about three type of control mechanism like cybernetic control, go no go control and post control.

For each three types I have explained what are the information required for cybernetic controls and finally I have provided a recommendations of performance and process improvement. Thank you. .