Project Controls 3.0 [1]

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Introduction

The purpose of this paper is to provide an overview of a new approach to the management and control of projects. This approach, Project Controls 3.0 (PC-3.0) is designed to build onto the existing developments in project management and project controls to:

1. Overcome the problems apparent in the current diverse range of project management and controls practices,
2. Implement a simple, robust system that is effective for all types of project delivery, and
3. Refocus the controls effort on helping management craft success, rather than report on history.

This paper is in two parts, the first part looks at the evolution of project controls and identifies some of the current issues and challenges. The second is a brief overview to introduce the concept of PC-3.0.

The Phases of Project Controls

In this paper, projects are considered to be an organized undertaking to deliver a predefined objective, within some level of time and cost constraint[2]. The degree of definition attached to each of these parameters is variable and depends on the nature of the work being undertaken.

Projects as defined above have been undertaken for millennia. However, the controls mechanisms used to keep the project on track to achieve its objectives have changed significantly over time. The three major phases of project controls are described below, with a discussion of an emerging stage – 4.0 included for completeness.

[1] How to cite this paper: Weaver, P. (2024). Project Controls 3.0; *PM World Journal*, Vol. XIII, Issue VI, June.

[2] A more complete definition of a project can be found at: https://mosaicprojects.com.au/PMKI-ORG-035.php#proj-definition

Project Controls 1 – Static

The earliest controls tools appear to have been models and drawings showing what was expected to be achieved. The design of the Cathedral Santa Maria del Fiore in Florence (above) was in the form of a large model. A separate design and model for the dome was made in the 15th century[3]. There are indications models were used in the design of the pyramids, and artistic representations continue to be an important element in the architectural design process[4].

By the 19th century a range of paper-based project management and control tools were emerging many of which are still used today[5]:

- Bar charts were in use by 1765, they started to be applied to projects in the mid to late 1800s.
- Orthographic projection (used for engineering drawings) was described in *Géométrie descriptive* (1798)
- WBS and OBS Charts were developed in the 1850s
- Project cost charts in the early 1900s.

These merged into a comprehensive project controls process by the 1930s[6].

The limitation of these developments was the static nature of the information. The project manager could see what was planned, could measure what was achieved or spent, and see the variance between the two. However, the systems could not (without a manual recalculation) predict the consequences of the variance. It required the development of computers in the 1950s to make project controls dynamic.

Project Controls 2 – Dynamic (2.X)

The second phase of project controls was driven by the development of dynamic project control tools. This started in 1957 with the development of CPM and PERT scheduling software[7] and has continued through to the present time. EVM was standardized in

[3] For more on the Cathedral Santa Maria del Fiore see ***Project Management in the 15th Century***: https://mosaicprojects.wordpress.com/2023/02/07/project-management-in-the-15th-century/

[4] For more on communicating design information see ***Understanding Design - The challenge of informed consent***: https://mosaicprojects.com.au/PDF_Papers/P186-Understanding_Design.pdf

[5] See ***The Origins of WBS & Management Charts***: https://mosaicprojects.com.au/PDF_Papers/P207_WBS_History.pdf

[6] See the USA Government report on the Wheeler Project: https://mosaicprojects.com.au/PDF-Gen/The_Wheeler_Project.pdf

[7] For more on the history of:
- The Critical Path Method (CPM) see: https://mosaicprojects.com.au/PMKI-ZSY-030.php#Overview
- The origins of PERT see: https://mosaicprojects.com.au/PMKI-ZSY-030.php#Process2

1960s[8]. Monte Carlo and other risk tools became available on personal computers from the early 1980s.

These dynamic tools have a number of common characteristics:

- Data is entered into a software tool and the result is calculated by the tool
- If a parameter or data point is changed, the tool immediately recalculates the results
- The calculations can be modified and influenced by the user, but the recalculation tends to be a 'black box' – the user can see the result, but not the incremental steps in the calculations
- These tools can hold and process vast amounts of data very quickly.

Project Controls 2.0 has developed into a sophisticated process needing highly specialized experts to run the software, with a focus on detail. It is not uncommon on a major project to see contractual requirements for a fully detailed schedule and cost plan for the entire project duration to be finished and approved within weeks of the project commencement. The responses to project failures have been to require even more detail in the various controls systems[9]. In the last couple of decades, this trend has fragmented into multiple different approaches to controlling projects - Project Controls 2.X.

Project Controls 3.0 – Adaptive (PC-3.0)

PC-3.0 is designed to use the 2.X tools developed in the last 60 years within a consistent framework to produce useful management information regardless of the management approach and tool set being used on the project. The technique is equally effective on agile projects, predictive traditional projects, and projects combining element of both.

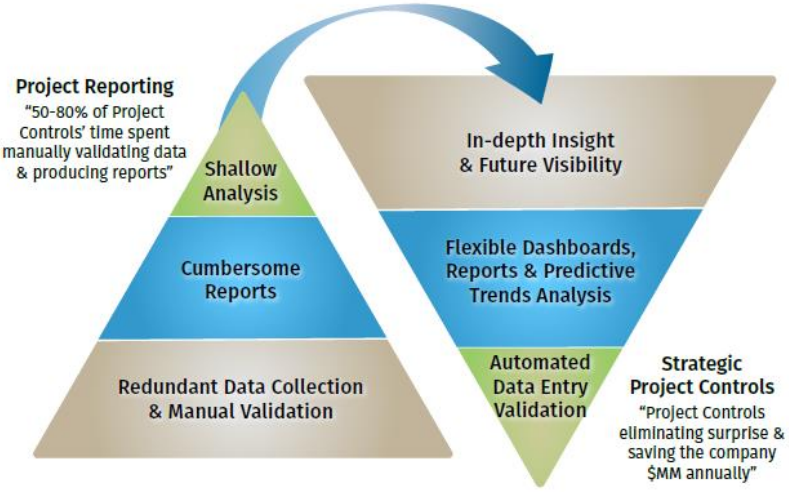
PC-3.0 is focused on using the planning function to support accelerated delivery and allow different ways of working in a complex environment. This is achieved by focusing on the future work, rather than what has happened in the past. This fundamental refocusing of controls towards improving future outcomes is essential if project teams are to make effective use of the emerging Project Controls 4.0 technologies.

[8] For the history of Earned Value Management (EVM) see:
https://mosaicprojects.com.au/PMKI-ZSY-020.php#EVM

[9] For discussion on the problems with excessive detail see:
- ***The Planning Paradox, How much detail is too much?***
https://mosaicprojects.com.au/Mag_Articles/AA022_The_Planning_Paradox.pdf and
- ***Estimating Fallacies – excessive detail does not help***
https://mosaicprojects.com.au/PDF_Papers/P145_Estimating_Fallacies.pdf

Project Controls 4.0 – Integrated

Project Controls 4.0 is already starting to emerge and is likely to become the dominant paradigm within a few years. Project Controls 1 through 3 are inherently stand-alone systems that use project data to calculate results. The data transposition between the project systems and the control systems may be semi-automated but they are essentially different tools run by different people.



The rapid emergence of AI, 3-D printing at scale, the IoT (Internet of Things), robots, etc., means that in a relatively short period of time, the software systems will be working with people to direct the performance of work across all types of projects.

At the moment, technologies such as BIM 10[10] and digital twins show how project elements interact and what needs to be done, and remote sensing can automatically measure what has been accomplished, but these tools do not directly control the work. However, within a few years we can expect embedded controls to become an integral part of the project digital twin. Seamless data, enhanced by AI, will provide virtual real-time access for all. The future will require a major refocusing of project controls effort from obtaining and managing data, to analysis, and using these insights to optimize future outcomes.

Summary – Phases of Project Controls

While the phases outlined above are described as discrete steps in the evolution of project controls, the reality is almost all can be found in use in different projects:

- Both static bar charts and architectural models are common showing Phase 1 concepts still have value in some situations.

- The current practice for most major projects is at the Phase 2 level of sophistication. However, as discussed in the section below, the cost and

[10] Building Information Modeling 10D : https://mosaicprojects.com.au/PMKI-ITC-011.php#BIM

complication of running a project using Phase 2 systems is fragmenting the project management discipline.

- Phase 3 controls are designed to overcome many of the problems and reframe the practice of project controls using current technologies. The paradigm shift in approach needed to implement Project Controls 3.0 is also a good foundation for the future.

- Phase 4 controls are starting to emerge and are predicted to be the future. No one knows precisely how this will develop, but it is highly likely that the majority of the work and software functions currently used by project controllers will be embedded in the project's digital twin. The controls and management skills needed will be focused on problem solving and optimization.

The subject of Project Controls 4.0 is for the future, the balance of this paper will focus on identifying the problems apparent in the current project controls paradigm, and then look at how Project Controls 3.0 can help solve some of the issues.

Problems with Project Controls 2.X

Project Controls 2.X uses the 'X' to represent the breakdown in project management and project controls into a diverse series of mutually exclusive branches. This is far from optimal for organizations that require consistency in project delivery. There seems to be three main trends in the way projects are managed, with a number of significant sub-trends.

1. **Traditional major project management**. These projects tend to have large, complex, highly detailed controls systems, focused on cost and schedule, often integrated into an EVMS or IMS. However, despite the ever-increasing levels of detail in the tools, project failure rates remain unacceptably high. Some of the problems include:
    a. **A focus on detail over usefulness**. Masses of unnecessary detail can be used to hide information, often deliberately, and particularly when the news is bad.
    b. **A refusal to allow flexibility**. The project plans are approved at the start of the project and cannot be changed easily. This is despite most of the people and organizations that will be required to undertake the work being unknown at the time the plans are finalized.
    c. **A focus on history**. 80% to 90% of a typical multi-page project report focuses on what has happened – you cannot change history. Most forward analysis is restricted to consideration of the risk register.

d. **A focus on cost over performance**. Cost is a symptom of performance, not a cause. A negative cost variance is a lagging indicator of a problem, to change cost outcomes, you either need to procure project resources more cost effectively, or use the project resources more effectively.

e. **Delayed reporting**. The size and complexity of the report means 3 to 4 weeks are needed to compile and deliver the report after the end of the reporting period. This means an average delay of around 6-weeks from the mid-point of the previous reporting cycle.

f. **A focus on allocating (or hiding from) blame**. Starting with negative variances in the monthly reports, and continuing through to post contract litigation and arbitration. The plans are supposed to represent the one correct way of working and blame is apportioned based on this premise.

g. **The need for layers of tools experts**. Experts in running the controls systems are found on both sides of the contract, often fighting each other to nuance the reported message in favor of their side. Management has little direct involvement or visibility.

2. **Agile and adaptive project management**. The widespread adoption of management philosophies such as Agile and Lean have abandoned the traditional approach and are focused on short term iterative planning within some overall project roadmap.

   a. These methods appear to offer improved outcomes, particularly on *soft*[11] projects. The core benefits are a focus on getting work done and adapting future actions to overcome issues.

   b. The major limitation in the techniques is a lack of effective forecasting. Most of the tools used for management are good at identifying work to do and work completed, but lack standard processes for converting this information into an expected completion date[12]. There are efforts underway to link agile with EVM, but this approach is being applied to a very small number of projects in a very limited area.

3. **The project management agnostics**. There is an increasing number of projects where the people running them have simply given up on using project controls. Most still report cost as a historical fact but little else:

   a. A surprisingly large number of traditional projects do not have a maintained CPM schedule.

   b. A large number of smaller projects have reverted to using simple bar charts.

[11] For a definition of soft projects, see ***Hard -v- Soft Projects***: https://mosaicprojects.wordpress.com/2023/01/21/hard-v-soft-projects/

[12] For more on calculating project completion in Agile projects see ***Calculating Completion***: https://mosaicprojects.com.au/PDF_Papers/P217_Calculating_Completion.pdf

c. Large sections of the agile IT industry are moving away from project management, adopting the concept of *flow* and progressive delivery[13].
d. The *No Estimates* movement suggests just getting on with the work, no need for plans.

Project Controls 2.X Summary

The above overview is very general. There will be hundreds of individual areas of excellence in specific organizations and thousands of well-run projects. However, these exceptions cannot hide the trend in project failure and the breakdown of project controls. There is a need for improvement. You cannot control the past, and cost is a symptom of past performance.

Project Controls 2.0 has grown into a complex system-of-systems embedded within the larger project management system-of-systems but rarely connected and coordinated with the management processes, and often of limited value in delivering successful outcomes. Increasing numbers of organizations and projects are simply abandoning this concept; many others pay lip-service to controls and buy a schedule or other plans from a consultant, send it off to the client, then ignore the plan and get on with the work.

The way projects are delivered is also changing, traditional controls paradigms are struggling to deal with a wide range of adaptive and distributed projects where there is no required sequence of working for large parts of the delivery process including:

- Physically distributed projects (housing estates, windfarms, etc.)[14]
- Most Agile projects[15]
- Projects delivered iteratively or incrementally (IID)
- Most other soft projects using adaptive work practices and agility (design is always a soft project)
- Complex projects where different approaches are used for different elements.

Project Controls 3.0 Overview

Project Controls 3.0 (PC-3.0) is designed to overcome the issues identified above and offer a robust, consistent approach to controlling all types of projects. The philosophy

[13] Removing the project overhead from on-going work is probably a good idea! The routine maintenance and upgrading of systems is business as usual, not a one-off project, see ***De-Projectizing IT Maintenance***: https://mosaicprojects.com.au/Mag_Articles/N010_De-Projectising_IT_Maintenance.pdf

[14] Discussed in ***WPM for Lean & Distributed Projects***: https://mosaicprojects.com.au/Mag_Articles/AA041_-_WPM_for_Lean_+_Distributed_Projects.pdf

[15] Discussed in ***WPM for Agile Projects***: https://mosaicprojects.com.au/Mag_Articles/AA040_-_WPM_for_Agile_Projects.pdf

driving PC-3.0 is pragmatic decision-making needs useful information at the right time. The elements of PC-3.0 are, at the assessment date are:

1. Knowing what work was planned to be accomplished
2. Knowing how much work has been achieved
3. Understanding what the likely consequences of the current production rate is on the projected completion
4. Doing something to change an unacceptable projection.

This requires a simplified project controls system focused on:

- A robust system that delivers timely information that is accurate enough to be useful
- A management team empowered to take action and make decisions to change the future course of the project's work
- Proactive problem solving focused on achieving the project's objectives.

This needs flexibility and adaptiveness in the management of the work, supported by both the project controls system and the contractual framework. Some historical information will still be important, particularly cost data, and where used EVM data, but these information flows come later.

Project Controls 3.0 Structure

PC-3.0 is designed to provide a consistent and repeatable controls function to support the successful delivery of most projects. To be used effectively three elements of the project need to be agreed and understood:

1. The project's objective has to be understood and capable of being measured in terms of the work required to achieve this. The objective being measured may be the whole project or the current iteration or release. The important elements are understanding what has to be accomplished, what finished looks like, and what work is needed to achieve the objective.

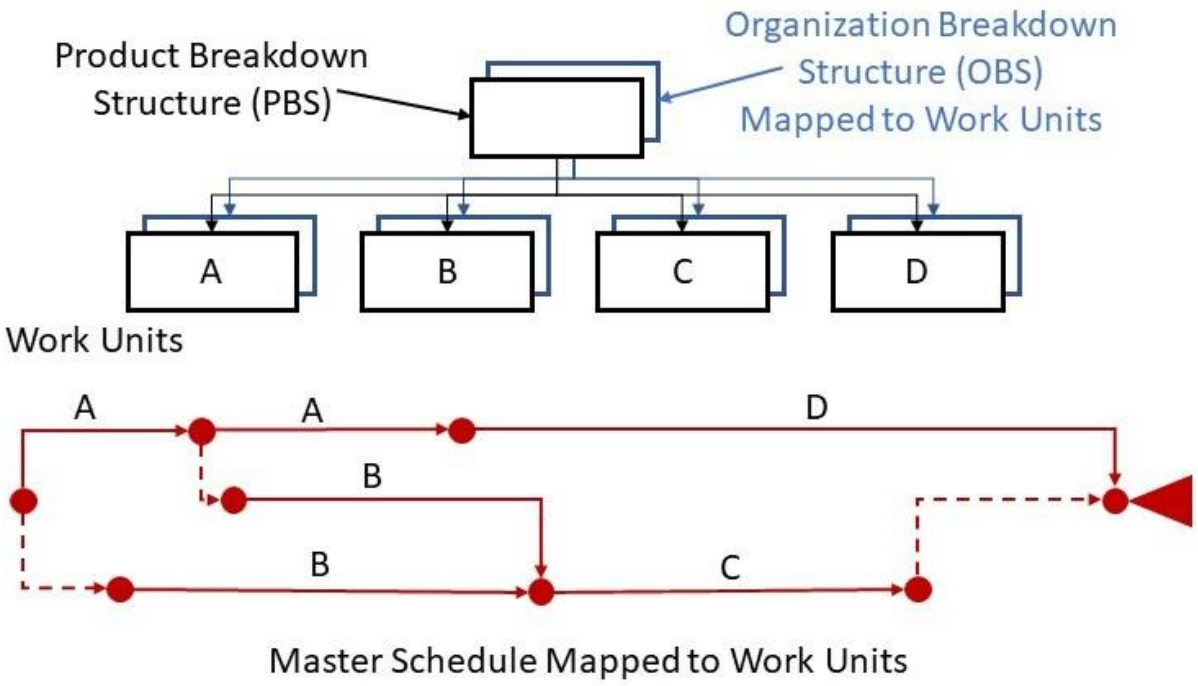
2. The time available to accomplish the objective. The primary focus of PC-3.0 is completion of the work on time.

3. The budget allowed to accomplish the objective. PC-3.0 sees cost as an outcome (a lagging indicator), but never-the-less cost is an important element in the successful delivery of most projects.

The management control point in a PC-3.0 project is the individual Work Units (WU). Each WU will typically be:

- Several months in duration
- Encompasses a complete area of work within the project. This may be a discipline (eg, design), a phase (leading to a milestone or phase gate), a major component, or for smaller projects, the entire project
- The responsibility of an assigned manager leading an integrated project team, with authority to control and direct the work.

Generally, the project's management structure (OBS) should mirror its product (or work) breakdown structure (PBS) both of which should focus on producing the deliverables required to achieve the project's objectives.



Master Schedule Mapped to Work Units

Each integrated project team (IPT) is empowered to manage the delivery of their WU including making decisions within defined parameters to ensuring the product is completed on time and complies fully with scope, quality, and technical requirements. Where a decision affects another WU recommendations are raised to the next level of management for approval.

Steps to implement Project Controls 3.0 (PC-3.0)

The core steps to implement PC-3.0 are:

1. Establish an overall strategy for the project, including setting the overall budget, time, and objectives. The strategy determines how the project's objective will be delivered.

2. Break the project down into appropriate WUs to implement the strategy, including assigning the budget, time, and sub-objectives for each WU.

3. Describe the project strategy in an overall Road Map determining the timing for each WU. The Road Map may be in the form of a CPM master schedule or a simple bar chart depending on the project.

4. Baseline the overall strategy, including the WUs and Road Map, to set the overall framework for delivering the project. Normally, this is not changed unless the project objectives change.

5. Map all control tools to the WUs – no exceptions.

6. Each WU should be delivered by an integrated project team (IPT) authorized to manage their work, with full authority to decide and act within defined parameters. Ideally each IPT will include a client representative with authority to actively assist in the delivery of the work, no one benefits from a late project.

7. Senior management within the project focus on the interfaces between WUs.

8. Only plan in detail what you know in detail, one WU at a time.

9. Different WUs will require different work methods and therefore different planning methods – use the one that works best for each WU.

10. Flexibility is required to adapt the short-term plan for the WU to deal with issues and achieve the outcomes set in the baseline.

11. Reporting focuses on the time needed to complete in-progress WUs, not what has been done. Predictive calculations are based on Work Performance Management (WPM)[16].

12. WU management focuses on defining the issues to be resolved, implementing actions to mitigate their effect on the WU's objectives, and deciding what will be done to reverse unacceptable trends.

Project control and reporting is exercised at the WU level. The PC-3.0 information on progress and predictions should be available to the WU management within one or two

[16] For an overview of WPM see: https://mosaicprojects.com.au/PMKI-SCH-041.php#Overview

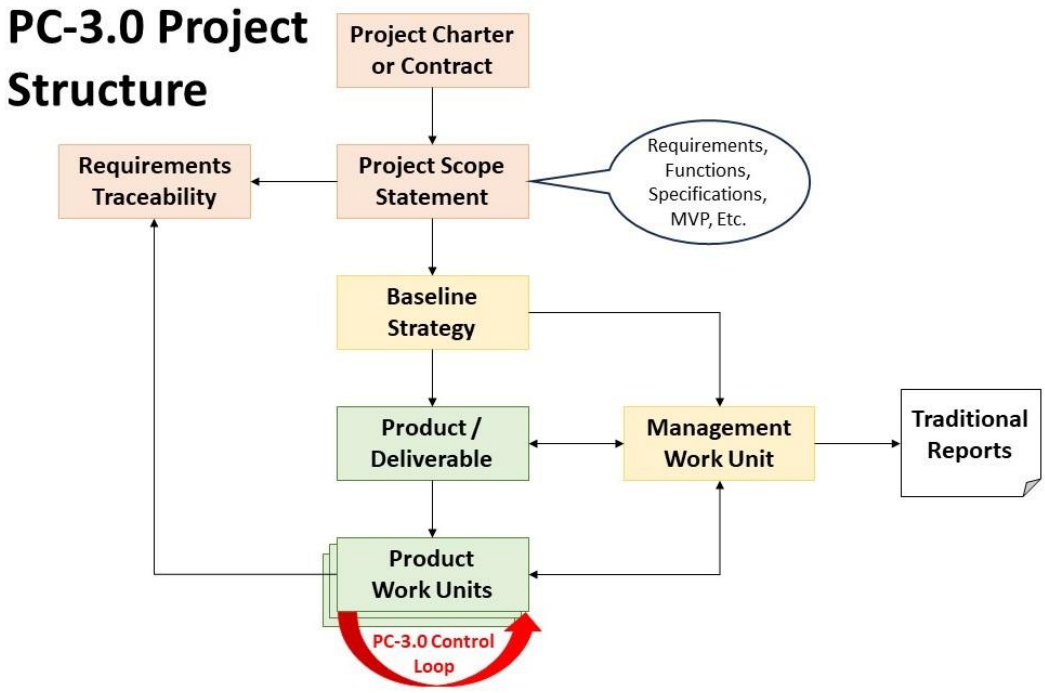
days of the end of the reporting period, allowing the corrective actions to be decided and implemented within a week (the controls information should not be a surprise). Cost, EVM, and other reports should be aligned with the WUs, but are likely to still require several weeks to obtain the information and process.

Work Units (WUs)

The WU is the core element in PC-3.0. In many respects a WU is similar to:

- Work Packages or Control Accounts in EVM and traditional WBS
- Assemblies in a Product Breakdown Structure[17]
- Phases in projects that have a staged development process
- An iteration, or a release in software projects
- Subprojects in projects that have different elements or sections of work.

The primary difference between a WU and other project breakdowns[18] is its size and management accountability. Each WU should be big enough to be managed, but small enough to overcome, or quarantine any problems that arise.



As with other project breakdowns, the full scope of the project should be included in the WUs. This means there is likely to be at least one WU that has no product deliverables, but includes the general management of the overall project and any supporting functions.

[17] For more on the difference between WBS and PBS see ***PBS -v- WBS, is there a difference?***: https://www.mosaicprojects.com.au/Mag_Articles/P028_PBS-v-WBS.pdf

[18] For more on project breakdown structures see ***Breakdown Structures Revisited***: https://mosaicprojects.com.au/Mag_Articles/P009_Breakdown_Structures.pdf

The other WUs should include all of the work required to deliver the output, including the direct management of the WU.

In most cases each WU will cover a complete area, or phase of work, minimizing the number of interfaces to other WUs. The exception is some project wide systems that need to function as a single entity, an example would be power loading and balancing across a major industrial complex. Generally, to the extent possible the physical components (wiring, piping, etc.) should be included in the WU they are physically a part of. However, the overall design, management, and commissioning of the system is the responsibility of a specialist WU. Where possible, this type of interface should be managed by having a member of the specialist WU team seconded to be part of each of the IPTs responsible for the delivery of the WUs containing the physical elements of work.

Managing Work Units

The key to PC-3.0 is using pragmatic controls information to inform proactive decision making within each WU. The two objectives being to enable other WUs to perform their work as intended and to complete the WU on time. If these two objectives are achieved efficiently, costs will be minimized.

The techniques used to manage each WU should be adapted to the needs of the work, the method chosen may include Agile, various disciplined approaches, Lean, CPM, or any combination as agree with the overall project management. However, unlike Project Controls 2.0, the approach used should be flexible and adaptive, responding to the current situation and focusing on achieving the required outcomes.

For example, if a CPM schedule is being used, at each update, after progress is recorded the future work in the schedule needs to be to be reorganized to the extent necessary to manage out of sequence working, and properly allocate work to the available resources. If necessary, the additional capability needed to deliver the WU on time should be obtained. Planning is proactive and adaptive focusing on optimizing the completion of the WU rather than worrying about what has occurred.

While the management of each WU is expected to be dynamic, adaptive, and focused on achieving the WU's objectives, the reporting requirements for each WU are standardized. The IPT running each WU is required to report on three key factors within 5 days of the end or the reporting period:

1. The amount of time needed to complete the WU, calculated using WPM.

2. Identified issues and challenges that are affecting (or will potentially affect) the calculated time to complete including:
   a. Stalled work – little progress since last reporting period

b. Technical debt / carry over

3. Proposed actions to recover any projected late completion.

Work Performance Management (WPM) requires a defined metric to measure the quantity of work in each WU that is robust and unambiguous. This can be different in each WU. The calculation of the time needed to complete the WU is based on the WPM principle that projects the current rate of performance onto the incomplete portion of the WU. This is not affected by the proactive and adaptive planning of future work. Systems do need to be in place to keep the IPT honest and minimize the probability of error, this is helped by the simple rigor of WPM.

By moving away from the large complex Project Controls 2.0 systems, management can become far more focused and dynamic, by ditching dashboards and complex reports, and focusing on a dynamic issues lists updated daily. The senior manager in the IPT should know the top ten issues weighted by criteria and the WU's issues log should record the issue's: name / description / root cause / consequence / key stakeholders (incl. other managers) / trend in list position / time in the list / action diary (who – what – when).

Assessing progress

The key to successfully implementing WPM is aligning the measure of work with factors used in the day-to-day performance of the work. The units can be:

- story points or function points for IT work
- Activity days for WUs using bar charts or CPM networks
- Physical measures such as meters of weld, volume of concrete, or other units of production
- Any other factor that is robust and easy to assess.

The factors used in the WPM calculation are:

1. The amount of work planned to be achieved at this point in time
2. The amount of work actually achieved at this point in time measured on the same basis
3. The performance ratio projected forward onto the incomplete section of the WU.

The calculated completion date is based on the presumption that nothing changes and tends to be pessimistic – this is the challenge for the IPT to overcome[19].

[19] The ***WPM calculations*** and how these are applied to different WU types are described in
- ***How WPM Works***: https://mosaicprojects.com.au/Mag_Articles/AA038_-_How_WPM_Works.pdf
- ***WPM for Agile Projects***: https://mosaicprojects.com.au/Mag_Articles/AA040_-_WPM_for_Agile_Projects.pdf

A few WUs will not have measurable work, managing this type of Level of Effort WUs should always retain 100% of future budget needed for the incomplete portion of the work, based on the estimated completion of the WU, typically derived from the projected completion of the other WUs being supported.Xx

Maintaining the strategic baseline

The key project management function is managing the interfaces between WUs. The key objective of the PC-3.0 Control Loop is to start each WU on time and wherever possible finish on time. But even when this is achieved, there is likely to be some interference between WUs and when a WU is experiencing difficulties, the degree of interference is likely to increase. Therefore, at the project level, the challenge is to be sufficiently adaptable to mitigate, or eliminate the flow-on of any holdup in a WU to its succeeding WUs.

The focus is on being proactive and adaptive but validated reasons are required for all changes to the strategic baseline, and these will normally only occur between the WUs currently in progress and any immediate successors.

As with any project, good quality information and good record keeping are essential. Governance issues to consider include:

- Trends matter
- Honesty matters
- Problems need to be identified early and fixed
- Management systems need to be simple, robust, and pragmatic
- Bad news hides in excessive detail

Ancillary Systems

PC-3.0 is focused on delivering each WU on time, optimizing the use of the available resources. The PC-3.0 Control Loop is a simple, robust system designed to empower IPTs to create success. An underlying assumption is achieving on-time or early completion of a WU utilizing the available resources efficiently will create the lowest cost outcome. What was budgeted is irrelevant, the best that can be achieved is the lowest cost of delivery. However, this does not remove the need for more traditional project controls functions running at the slower rates typical in most of today's projects.

- ***WPM for Lean & Distributed Projects***: https://mosaicprojects.com.au/Mag_Articles/AA041_-_WPM_for_Lean_+_Distributed_Projects.pdf
- ***WPM Solves CPM Optimism***: https://mosaicprojects.com.au/Mag_Articles/AA039_-_WPM_solves_CPM_optimism.pdf

Cost Control

Cost control functions should be expected to operate in much the same way as today. The only difference is that the cost breakdown should to the extent possible, follow the WU breakdown. Cost reports are typically available some four weeks after the end of the reporting period.

EVM

Earned Value Management (EVM) requires the same cost information and typically operates in a similar timeframe. If EVM is being used, either the Control Accounts or Work Packages should align with the WUs. With proper alignment, the Earned Schedule component of the EVM system will serve as a validation for the simpler WPM predictions.

Project Reports

Traditional project reports are also likely to be required. These can be produced in the same timeframes as now; the only difference may be the inclusion of a section detailing the PC-3.0 activities and assessing the success of earlier initiatives.

Contractual Issues

Introducing PC-3.0 and the use of Integrated Project Teams (IPTs) for each WU whilst benefiting from a supportive head contract, does not require much change in this level of contract. The client wants its project delivered on time and to the required quality standards. If PC-3.0 is achieving this everyone will be happy. Generally, a client cannot dictate how a contractor performs its work, and while having client representatives embedded in each IPT is desirable it is not essential.

The project's subcontracting and procurement activities is where change is needed. The relationship with suppliers and subcontractors needs to be developed to facilitate an adaptive approach focused on success. Various forms of alliance, partnership and gain-share/pain-share contracts are needed.

Assessing Delay and Disruption

Contrary to modern dogma, you do not need a CPM schedule to assess delay and disruption. Projects using PC-3.0 will inevitably be subject to changes, variations, and disruptions in the same way every other project is, and has been for the last 100+ years. The law relating to contracts, delay, and liquidated damages, was determined in the 19th and early 20th centuries, decades before critical path scheduling (CPM) became commonplace in the 1960s. The trend away from CPM in the 21st century is accelerating with more contracts requiring the use of agile and adaptive practices.

Assessing delay and disruption in projects that are not using CPM requires the same fundamental fact to be demonstrated, the intervening event caused a delay to the work of the project which flowed through to cause a delay in completion. All that changes is the way the delay and its consequences are demonstrated[20].

Recommendations and Conclusions

The core tenets of Project Controls 3.0 are:

1. Bad news does not improve with keeping, the sooner an issue is highlighted the sooner work can start on resolving the issue and repairing the damage

2. Control information does not improve with masses of irrelevant detail, robust simple processes that provide insight quickly are preferred

3. Focus on the things you can control:
   a. You cannot change the past, history is a fact
   b. You cannot do much about tomorrow, it is too late
   c. The opportunity to manage is the future, starting with optimizing next week's work

4. Cost is a lagging indicator, if you want to change cost outcomes you need to improve procurement process or make better use of the resources already available
5. All other things being equal, the cost of completing some work is a fact, you can finish slowly with inadequate resources or more quickly with the right resources – completing on time is likely to have the lowest cost implications.

The history of software development has shown that the best outcomes are achieved by allowing management the flexibility to succeed. PC-3.0 is the tool to highlight the areas of a project that need proactive adaptation to overcome emerging delays before they become intractable.

The challenge in implementing PC-3.0 is not the technology, it is cultural. WPM runs in a simple spreadsheet, most of the rest of the requirements for PC-3.0 are well understood current practice. The difficulty will be shifting management attitudes from a focus on history and cost, neither of which can be changed, towards actively seeking to identify, then resolve problems proactively – no more hiding issues in a mass of detail.

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[20] Assessing delay and disruption in projects without a normal 'critical path' and some current caselaw dealing with projects of this type is included in Assessing Delays in Agile and Distributed Projects: https://mosaicprojects.com.au/PMKI-SCH-041.php#Delay

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Patrick Weaver, PMP, PMI-SP, FAICD, FCIOB, is the Managing Director of Mosaic Project Services Pty Ltd, an Australian project management consultancy specializing in project control systems. He is a Fellow of the Chartered Institute of Building (FCIOB), and a Fellow of the Australian Institute of Company Directors (FAICD). He is a member of the PMI Melbourne Chapter (Australia), as well a full member of AIPM, and the Project Management College of Scheduling (PMCOS).

Patrick has over 60 years' experience in Project Management. His career was initially focused on the planning and managing of construction, engineering and infrastructure projects in the UK and Australia. The last 40 years has seen his businesses and experience expand to include the successful delivery of project scheduling services and PMOs in a range of government, ICT and business environments; with a strong focus on project management training.

His consultancy work encompasses: developing and advising on project schedules, developing and presenting PM training courses, managing the development of internal project control systems for client organizations, and assisting with dispute resolution and claims management.

In the last few years, Patrick has sought to 'give back' to the industry he has participated in since leaving college through contributions to the development of the project management profession. In addition to his committee roles, he has presented papers at a wide range of project management conferences in the USA, Europe, Asia and Australia, has an on-going role with the PGCS conference in Australia and is part of the Australian delegation to ISO TC258.

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