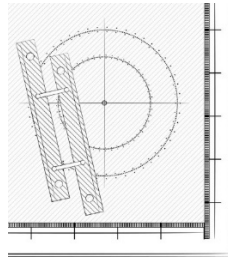


JEREMIE AVEROUS

With Thierry LINARES and Farhang PAKZAD

Advanced Scheduling Handbook for Project Managers



A Practical Navigation Guide
on Large, Complex Projects

Second Edition



© J. Averous, T. Linares, F. Pakzad
& Project Value Delivery
Second Edition - 2023

Published by Fourth Revolution Publishing, Singapore
A trademark of Fourth Revolution Pte Ltd
8 Burn Road #08-02/03 Singapore 369977,
www.FourthRevolutionPublishing.com
All rights reserved.

Except for short excerpts used for illustration or educational purposes, which then shall reference the original book, no part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Publisher, Fourth Revolution Publishing – contact@thefourthrevolution.org

While the publisher and the author have used their best efforts in preparing this book, they make no representation or warranties with respect to the contents of this book and specifically disclaim any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives or written sales material. The advice and strategies contained herein may not be suitable for your situation. You should consult with a professional where appropriate. Neither the publisher nor the author shall in any event be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages.

URLs have been checked at the time of writing of this book and the publisher has no responsibility for the persistence and/or accuracy of these links.

In this book, the alternating of gender in grammar is utilised. Any masculine reference shall also apply to females and any feminine reference shall also apply to males.

This book has been sponsored by Project Value Delivery,
a leading consulting company in the field of Project
Management for Large, Complex Projects

www.ProjectValueDelivery.com - contact@ProjectValueDelivery.com



We Empower Organizations to be Reliably Successful in
Executing Large, Complex projects.

Discover more on
www.ProjectValueDelivery.com

This book is available worldwide both in paperback format and Kindle e-format, through all e-bookstores including Amazon, Barnes & Noble, etc.

Contact us for bulk orders or customised editions!

ISBN: 978-981-18-6534-3

Published in Singapore.

Second edition – March 2023



We can Customise this Handbook for your Organisation.

We have found that organisations find great value to have their own internal handbooks to cover Project Control issues. These full-colour, custom-branded handbooks can be spread to a wide population.

Thanks to our publishing partnership, this generic handbook has been successfully customised and printed in many hundreds of copies for some major global Project-driven businesses.

Conducted after a careful review of the organisation's particularities, and tailored to respond to your needs, such a customisation includes:

- Specific systems and processes,
- Specifics of the industry and construction context.

Contact us for a customisation Project.

Get Advanced Training delivered.

The best practice concepts of this handbook get best spread in your organisation through training programs. We deliver trainings globally based on the contents of this handbook and customised to your particular needs.

Contact us for a training Project to bring your organisation to the next level in terms of Project Scheduling.

Contact

Contact @ ProjectValueDelivery.com



We Empower Organizations to be Reliably Successful in
Executing Large, Complex projects.

Discover more on
www.ProjectValueDelivery.com



In the Same Series

1. The Pocket Guide for those Daring Enough to Take Responsibility for Large, Complex Projects
by Jean-Pierre Capron
2. Project Soft Power, *Learn the Secrets of the Great Project Leaders*
by Jeremie Averous
3. Practical Cost Control Handbook for Project Managers, *a Practical Guide to Enable Consistent and Predictable Project Forecasting* (Second Edition)
by Jeremie Averous
4. Practical Project Risk Handbook for Project Managers, *a Guide to Enhance Opportunities and Manage Risks on Projects*
by Jeremie Averous
5. Advanced Scheduling Handbook for Project Managers, *a Practical Navigation Guide on Large, Complex Projects* (Second Edition)
by Jeremie Averous with Thierry Linares and Farhang Pakzad
6. Practical Project Control Manager Handbook, *from Back-Office Manager to Trusted Project Strategist*
by Jeremie Averous
7. Industrial Projects Practical Owner Guide, *Securing your Capital Investment*
by Jeremie Averous

And more to come...

Discover the latest publications and more on:

www.ProjectValueDelivery.com

Contents

FOREWORD TO THE SECOND EDITION BY PIERRE DEMONSANT	1
FOREWORD TO THE FIRST EDITION BY JEAN- MARC AUBRY	3
INTRODUCTION TO PROJECT NAVIGATION	5
Why Project Navigation?	5
A Practical Handbook	7
The Handbook's Structure	8
Topics Not Covered in this Handbook	9
Who Is This Handbook For?	9
CHAPTER 1: SCHEDULING GOLDEN RULES	11
CHAPTER 2: THE SCHEDULE HIERARCHY	15
Introduction	15
Recommended Schedule Hierarchy Overview	16
The Convergence Plan	22
The Integrated Project Schedule	23
The Simplified Project Schedule	24
The Lower-Level Functional or Contractor Schedules	26
Maintaining Consistency in the Schedule Hierarchy	27
When Project Managers Use Different Schedules for Different Purposes	28
Conclusion	31
CHAPTER 3: PRODUCING AND USING THE CONVERGENCE PLAN	33
Preparing a Meaningful Convergence Plan	33
Monitoring and Taking Action on Deviations	37
Scalability of the Convergence Plan Concept	42
Summary: the Discipline of Convergence Management is the Key	43

CHAPTER 4: PRODUCING THE INTEGRATED PROJECT SCHEDULE	45
Setting up the Map of the Journey	46
Who is the Integrated Project Schedule for?	47
Producing the Integrated Project Schedule	47
Main Issues in Large Projects' Scheduling: Detail Level and Balance between Functions	54
Float Management Philosophies	59
Specific details to be Included in the Integrated Project Schedule	61
Schedule Rebaselining	65
Conclusion: Take the Time to Devise a Proper, Usable Integrated Project Schedule	66
CHAPTER 5: SCHEDULE AND PROJECT LIFECYCLE	67
Feasibility Study/ Tendering Stage	67
Project Start-Up and Engineering Stage	71
Project Procurement Stage	73
Project Fabrication/Manufacturing Stage	75
Project Construction & Commissioning Stages	76
Project Close-Out Stage	79
Relevant Schedule Reporting Tools	79
Conclusion	80
CHAPTER 6: HOW TO EASILY CHECK THE QUALITY OF EXECUTION SCHEDULES	81
Schedule Correctness Checks	83
Schedule Realism Checks	91
Conclusion	98
CHAPTER 7: HOW TO INCREASE THE RESILIENCE OF YOUR SCHEDULE: SCHEDULE STATISTICAL ANALYSIS	99
Introduction: the Straightest Way is not Always the Fastest and Surest	100
What You Should Really Seek When Conducting a Schedule Statistical Analysis	100
How to Perform Properly Schedule Statistical Analysis	101
Tips for Enhancing Schedule Resilience and Project Manoeuvrability	106
Conclusion: Improving your Schedule Resilience before Starting your Project is a MUST	110

CHAPTER 8: UPDATING THE SCHEDULE FOR ACTUAL PROGRESS	111
What Schedule Updating is About	111
Schedule Updating Needs to be a Bottom-Up Exercise	113
How to Quickly Check the Quality of a Schedule Update	113
The Problem of Facing Reality	114
Schedule Update: Properly ' <i>Taking the Sigh</i> ' of the Project	115
Re-sequencing versus Re-baselining	122
Conclusion: Listen to Your People – Use the Schedule to Transform Informal Knowledge into Formal Knowledge	124
CHAPTER 9: SCHEDULE FORECASTING BASICS	125
Why Forecast our Future Trajectory?	125
The Three Steps of Re-Forecasting	126
At What Level is Re-Forecasting Best Approached?	127
Basics of Schedule Re-Forecasting	129
Conditions for Forecast Quality	133
Basic Forecasting Approaches by Type of Activities	135
Conclusion	143
CHAPTER 10: SCHEDULE FORECASTING ADVANCED: IDENTIFYING THE PROJECT DRIVERS	145
Is the Critical Path Really Critical?	145
The Fallacy of 'Virtual Float'	150
Real World Project Re-Forecasting	151
Float Monitoring Techniques	153
Project Delay Heuristics	157
Conclusion	157
CHAPTER 11: MANAGING CHANGES: THE NEED FOR SCHEDULE AGILITY	159
Introduction: Your Plan won't Survive the First Encounter with Reality	159
The Importance of Clear Project Objectives	160
Stop Taking Change as an Exception: The Need for Agile Project Planning	161
Why You Need to Avoid As Much As Possible Intermediate Constraints in Project Execution	165
Conclusion – Be Flexible but Identify and Uphold the Project Purpose	168

CHAPTER 12: INCREASING SCHEDULE RELIABILITY	171
How To Be On Schedule Reliably	171
Why Project Planning Is (Almost) Always Optimistic	172
Why You Need To Buffer Your Schedule	176
How to Buffer Your Schedule in Practice	179
Improving short term schedule reliability with techniques such as the 'Last Planner System®'	182
Conclusion	183
CHAPTER 13: CONTRACTUAL ASPECTS OF SCHEDULE MANAGEMENT	185
Never Forget that Time has More Value than Cost	186
Contract Review: Identify the Particulars of Your Contract	187
Who Owns the Float?	189
Justifying and Demonstrating Extensions of Time	192
Cost Valuation of Time	200
Hacking Through a Decision	204
Conclusion	208
CHAPTER 14: EXAMPLE OF PRACTICAL APPLICATION OF THE CONCEPTS OF THE BOOK	211
Introduction and Project Description	211
Developing the First Revision of the Convergence Plan	212
Developing the First Revision of the Integrated Schedule	213
Detailed Schedules	215
Preparing Bid Documents for EPC Subcontractors	216
Contracting and Executing the Work	216
Updating and forecasts	217
Look Ahead Planning & Workfront Planning	219
Schedule control	220
Simplified Project Schedule – Scenario Analysis	222
CHAPTER 15: FORENSICS OF PROJECT EXECUTION SCHEDULE MANAGEMENT	225
Failure Modes for the Scheduling Process	225
Level 1 Checks – Schedule Update Accuracy	226
Level 2 Checks – Quality of Schedule Forecast	230
Level 3 Checks – Quality of Decision Support	233
Conclusion	234
CONCLUSION: THE PROJECT SCHEDULE, YOUR NAVIGATION TOOL	235

APPENDIX 1: INTEGRATED PROJECT SCHEDULE BASIC HEALTH CHECKLIST	237
APPENDIX 2: MONTHLY SCHEDULE UPDATE AND RE-FORECASTING CHECKLIST	239
APPENDIX 3: PROJECT LIFECYCLE SUCCESS FACTORS	241
APPENDIX 4: INTEGRATED PROJECT SCHEDULE TECHNICAL CHECK CRITERIA	247
APPENDIX 5: TEN USEFUL SCHEDULE RULES OF THUMB	251
APPENDIX 6: SCHEDULE LEVELS AND WORK BREAKDOWN STRUCTURE	253
APPENDIX 7: EARNED SCHEDULE MANAGEMENT	259
ABBREVIATIONS AND GLOSSARY	267
TABLE OF FIGURES	273
ACKNOWLEDGMENTS	274
INDEX	277

Foreword to the Second Edition by Pierre Demonsant

As the co-founder of a leading project portfolio management software editor, I have been at the forefront of the evolutions in project scheduling for the last 25 years. Interacting with industrial organisations about project scheduling has allowed me to identify important lessons.

The development of scheduling software over the past decades has provided unprecedented capabilities to project managers and project planners. This has unfortunately frequently led to developing too large schedules under the mistaken impression that more detail leads to better control. It has been a constant observation and an uphill struggle to convince clients that keeping control of their projects requires schedules that are manageable in size. Rather than on details, the focus must be on reflecting the actual schedule logic. The limitation actually lies in the capabilities of the user of the software, who must understand how to use it accordingly. This book provides a welcome perspective in explaining how even very large and complex projects and programs can be kept under control while maintaining each schedule manageable in size.

One of the developments we have been working on is to ensure proper synchronization of a hierarchy of schedules of varied levels of detail so as to minimize manual work in this frequent situation. Such an automatization only works properly if the scheduled data for the project is properly structured. The importance of a proper work breakdown structure and in general, coding of the schedule is becoming nowadays even more important with the new capabilities offered by the analysis of large amounts of data. Unfortunately, most organizations are unable to benefit from the value of those new powerful approaches because

their historical schedule databases are not properly coded or structured. This should certainly be an increasing area of attention in the near future and planners have to increase their attention to the matter. Moreover, projects are increasingly being executed in extended enterprise setups. In this situation, managing and synchronizing a set of schedules from all contributors is paramount; here again, proper setup and consistent coding of schedules is the key to success.

In a recent evolution, criteria have been published on schedule technical quality which really start to be widely implemented, like the DCMA criteria published a decade ago and referenced in this new edition. This is a new, positive evolution, keeping in mind that those schedule quality criteria should be adapted to the circumstances and needs. They will certainly prevent inadequate schedules to be used for important project decisions. Some scheduling software now includes automated schedule's quality checks. This new edition of the book addresses those evolutions which are still to be applied more systematically in the scheduling community.

Scheduling is a science that requires deep practice and knowledge. This book reflects many useful lessons that are still too often ignored in large projects, and I hope this book finds a large readership to improve substantially scheduling practices.

Pierre DEMONSANT
CEO and co-founder, Planisware
March 2023

Foreword to the First Edition by Jean-Marc Aubry

In the Oil and Gas business as in industrial projects, the shareholders, investors and clients are increasingly requesting fast-track schedules and fast completion of projects. The objectives are to optimise their financing costs and conditions, satisfy the market and their own clients, benefit of competitive advantages, help them to reduce the pay-back as much as possible and keep their leading positions.

Today, all parties including contractors are facing very difficult schedules and related complex strategies to meet these objectives. The risk-taking has increased, the floats are disappearing, and any delay is a disaster for the contractor, his direct client and the shareholders.

Still around 20 years ago, we were working on sequenced phases: engineering, procurement, construction, start-up and Operations (EPC), where nowadays people are more and more dreaming of CPE...

I like to take the story of the driver leaving for a long journey by car. Either he jumps in the car, with the map on the side seat and tries regularly to look at his way, or he spends a bit of time to study ahead the best route, combining estimated time, distance, highways and gasoline costs, safety aspects, anticipating traffic jams... Both will arrive at their final destination. The first one with no control on his journey and constant pressure, the second one will arrive on time and at the best satisfaction and safety of his passengers.

This illustrates perfectly what scheduling and planning are for a project.

For some people, the schedule is a thick Primavera document, established by the Scheduling department, and that nobody understands or looks at.

For the experienced Project Director, it will be the perfect translation of his project strategy. It will contain his analysis of the risks and the corresponding mitigations, the floats he can anticipate, the contractual approach he has to implement, the key milestones he has to meet to secure step by step his project schedule-wise but also budget-wise.

Out of a full booklet of detailed schedules, he will be able to extract a simple document, with key milestones and critical paths, which will help him drive his project to the right end, anticipating any disturbance by the proactive actions he will be able to implement.

To establish such a route book, the Project Director counts on his most critical partner who is the Schedule Manager, able to understand the strategy of the project, the risks, and develop, thanks to a large experience in this 'Science', the right itinerary.

This partner will also be the 'Master of the Temple', alerting, simulating, evaluating alternatives, to continuously help to stay on the road.

The authors have become this kind of Master, building a very rich experience in this crucial domain, continuously looking for improvement and creative approaches, which are the key of a successful project.

I have been very honoured to write a few words for this handbook, our experience on the Yamal project is not only a professional journey, but also a personal and high value cooperation based on trust. Very few people have developed a so deep understanding of their role and mission. This may be what we call simply professionalism.

Thanks for this very interesting analysis which will benefit to the profession.

Jean-Marc AUBRY
Yamal project – Fellow Executive Project Director
Previously President, Technip France
June 2015

Introduction to Project Navigation

Why Project Navigation?



A project is like an intercontinental sailing expedition. When executing a project, one needs to define the goal and a plan to reach it; and then, fit out a vessel with the appropriate quantities of fuel and supplies to last for the long voyage, and finally, recruit the right crew.

The days are long gone of the adventurers that cast off without any idea of goal or direction – that may still exist in some R&D contexts but very rarely in the context of Large, Complex construction projects.

When the vessel has finally left the shore to begin the uncertain voyage towards a new continent, left to the forces of the sea, the currents and the winds, there are three fundamental navigation questions that require an accurate response, on a regular basis:

- Where are we?
- Where are we heading to (if we continue according to the present trend)?
- What adjustments do we need to do to come back on course?

The result of these three questions leads to a decision that needs to be taken consciously - in the present circumstances, whether or not to amend the current course of the vessel, or the sails' configuration. Proper navigation and decision-making are intertwined.

Our experience in consulting for Large, Complex projects shows that a large percentage of the project organisations –half of them maybe– cannot even respond adequately to the first question (‘where are we?’). They fail to have adequate monitoring tools and information gathering processes that would give them an accurate picture of the actual status of the project. As a result, they take navigation decisions on the basis of inaccurate status information!

Our experience shows that many Large Projects don't know exactly where they are; and in the remaining projects, a large proportion can't fully forecast where they are going.

Then, amongst those other organisations that succeed in maintaining accurate status data, another large proportion are not able to identify and extrapolate the observed trends and determine how much they will deviate from the initial navigation plan if they were to continue unimpeded. Even more so, when seeing a storm form on the horizon, many Project Managers today are at a loss to take the right decisions to react to it by changing course or changing the sails' configuration. This lack of capability for anticipation has thrown many sailors helpless on chartered reefs and continues to do so in the realm of project management.

Today, automated systems on ships and aircrafts still do constantly implement small course corrections based on the same three questions so as to reach safely their destination. These automated systems are able to respond to small perturbations, but human monitoring is still required for the management of large and unexpected changes. Actually, the issue today is still to teach Captains the basics of good ol' navigation so that they understand what is important and where and how automated systems can support - and where they find their limits.

In the field of project management, we observe that Project Managers today have sometimes taken a back seat behind those terrific scheduling systems that seem to promise full control on all events happening on the project, like a GPS. This is an illusion – those systems are generally

not well implemented, and not properly used. They have intrinsic limitations that are not well understood. Most successful Project Managers today still fly by the seat of their pants and smell the sea to navigate prudently. However, these experienced hands that started their career scheduling manually on paper will soon be part of the heroic history of project management, and the newer generations seem to have lost the feeling for the reality of actual project navigation.

It is the ambition of this handbook to re-establish the basics lost in time of Project Scheduling for today's Project Managers. Automated tools can have great power when one knows how to use them properly and understands their limits, and they should be used to leverage what can be achieved – but in no case can they replace the sound judgment and experience of Project Managers.

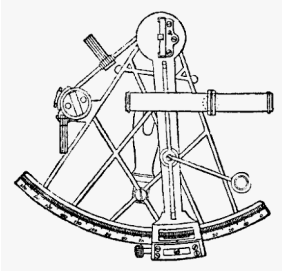
There lies the ambition of this handbook – a Navigation Handbook for the Project Managers of Large and Complex projects of modern times.

A Practical Handbook

This handbook has been specifically written in the particular context of Large and Complex construction projects.

This handbook does not intend to be a 'starters' guide to project scheduling as it tackles advanced topics. It does not cover, in particular, the basic technicalities of scheduling, but concentrates on the perspective of project

management's check and usage of schedule as a decision-making tool. In other words, it concentrates on how the Captain should use the navigation process to reach the destination safely – but will not describe the sometimes-tedious navigation calculations.



We will use historical sailing ship navigation instrument drawing such as the one on the left to highlight those sections that refer to the principles of navigation.

Those sections will form a thread running throughout the entire book, where traditional navigation tools and processes will be quoted as a useful metaphor to put the concepts in perspective.

Our intent is that well worn-out copies of this navigation handbook will be found on every Planner's, Project Control Manager's and Project Manager's desk.

The Handbook's Structure

Chapter 1 covers a number of sound Scheduling Golden Rules that summarise key principles that are essential to proper project schedule management. All those concepts are developed in this handbook.

Chapter 2 describes the best practice in terms of the set of different schedules (the '*schedule hierarchy*') needed to support the execution of projects, for any size or complexity. Essential pieces are the Convergence Plan and the Integrated Project Schedule. Chapter 3 and 4 describe best practices for building these two central components.

Chapter 5 and Chapter 6 give key insights for Project Managers to check the quality of schedules and improve them prior to, and during project execution. Chapter 7 covers in particular what insights can be drawn from Schedule Statistical Analysis.

Chapter 8 to 10 describe the best practices for the central scheduling processes during project execution: updating and re-forecasting. Re-forecasting has been split in two chapters, with Chapter 10 devoted to advanced concepts around critical path and float management.

Chapters 11 to 13 cover advanced topics related to project scheduling:

- Ensuring sufficient agility of the project schedule to face the inevitable changes,
- Introducing the concept of schedule buffer as a way to create more realistic and manageable project schedules,
- Explaining the basics of how to use the schedule for contractual purposes, in particular in cases of request for Extension of Time.

A newly introduced Chapter 14 provides a practical example of the application of the concepts of this book on an actual project.

Finally, Chapter 15 summarises how to assess effectively the quality of the project scheduling process. The Chapter contains a number of easy-to-use reference checklists for project reviews.

Various appendices provide more detailed checklists for a variety of purposes, and more in-depth developments around breakdown structures and Earned Value Management and Earned Schedule.

Topics Not Covered in this Handbook

This handbook is focused on the practice of project scheduling during project execution. The following topics are not covered in this handbook:

- Basic scheduling concepts,
- Technical use of scheduling tools/software,
- Quantity surveying,
- Forensic schedule analysis and quantum allocation for claims – for which very specialised handbooks exist.

Who Is This Handbook For?

This handbook is explicitly for Project Sponsors, Project Managers, Project Control personnel (in particular Scheduling Managers and Leads) and all those who aspire to become Project Managers; Budget Owners within projects (Package Managers, etc.) as well as functional managers that are involved in scheduling and resource planning.

The book is useful for both owners and contractors; specific points of attention for a particular category have been highlighted.

This handbook has been primarily written from the perspective of the Project Manager or Project Management Team, who use schedules to take decisions in action. It is quite different from the usual perspective of scheduling professionals who are sometimes centred on the excellence

of their tools' usage. This handbook thus differs markedly from most books on project scheduling. By taking this different point of view, we believe that this book will fill-in a much-needed gap between project management and schedule professionals and create useful conversations in organisations.

Chapter 1:

Scheduling Golden Rules

The main objective of Scheduling management is to enable the Project Manager and its management to take decisions derived from an accurate current knowledge and understanding of reality, with the aim of reaching a successful project outcome.

From this broad objective, a number of Golden Rules describe the basic requirements of Schedule Management.

In all instances, 20 Golden Rules need to be followed when it comes to project scheduling.

1. **Accountability:** Budget Owners are ultimately accountable for their schedule (including update and forecast). Planners support and challenge Budget Owners. The Project Manager is ultimately accountable for the entire project schedule and shall dedicate sufficient time and effort on this essential navigation tool.
2. **Project Scope, Cost & Schedule consistency:** the project schedule is at all times consistent, comprehensive and intrinsically linked with the two other sides of the project Triangle: the project Scope, and the project Cost. The project Scope is described in the main Contract or specification, including Change Orders and approved Changes. In particular, the *Project Cost Model* (including cost time-phasing consistent with the project schedule) is continuously updated by the Project Control team consistently with the schedule.

3. **Align with the project strategy:** in addition to remaining consistent with cost and scope, the schedule responds to the project strategy: contractual strategy with the owner/ client and suppliers, decision-making logic, and more generally, execution strategy of the project and key success drivers.
4. **Develop schedules from the top down:** to ensure alignment with the project intent and design of best execution strategies, develop schedules from the project strategy and objectives i.e. from the top of the scheduling hierarchy, and not from Detailed Functional Schedules.
5. **Reflect reality candidly:** The schedule must reflect candidly the reality of the project progress status and associated re-forecast, however difficult or annoying this reality could be.
6. **Immediacy principle:** It is essential to reflect significant new schedule variances as soon as their occurrence is known (e.g. internal or client's instruction to proceed), at least in terms of order of magnitude, even if their exact final duration has not been fully assessed. Subsequently, immediate notification of the other Party to the contract is also essential to protect one's commercial interest.
7. **Implement a Proper Schedule hierarchy and formats.** Different scales, details level and views are suitable for different usages. Build a consistent schedule hierarchy and make good use of the different detail levels. Use different schedule views for different purposes and users.
8. **Limit detail and complication of the Integrated Project Schedule.** It should focus on functional interface and critical areas. 2,000 to 2,500 activities would be a maximum, with an emphasis on links between functions, and a proper balance between project phases and functions. Choices will have to be made. It is linked to the necessity to have a comprehensive schedule hierarchy to respond to the needs of all project contributors and stakeholders.

9. **Increase the schedule robustness and resilience instead of minimising the Critical Path.** Increase the float of non-critical sequence of events to ensure they will not become critical and introduce allowances and a contingency managed by the Project Manager.
10. **Float and Buffers are to be owned by the Project Manager.** Float knowledge and ownership should not be spread through the project team relinquishing effective control. It is an essential project management tool.
11. **Fight the 'virtual' float creation.** When a schedule moves to the right because of delays, in effect it creates float for all activities that have to be performed. Avoid this pernicious effect by sticking to the discipline of Convergence Planning and updating your Integrated Project Schedule so that this 'virtual' float is not unduly created where it should not. Introduce explicit buffers if required that remain under the control of the Project Manager.
12. **Be disciplined in updating the Convergence Plan.** Don't change the dates of the gates and only show deliverables completed when they are 100% complete. And when there are deviations, actual or forecast, the Project Manager and the supporting organisation must take the relevant recovery actions.
13. **Update the schedule bottom-up** based on the project extended team's knowledge.
14. **Check regularly the quality of the schedule update** to make sure decisions are taken on a robust basis.
15. **Base the schedule re-forecast on a root cause analysis,** not a simple bottom up approach. Use Earned Schedule as a useful challenge. Don't forget to reforecast accordingly future activities that would be impacted by the same root cause.
16. **Reforecast future activities based on the knowledge acquired from ongoing and past activities.** This is too often forgotten in schedule updates.

17. **Accuracy over precision:** schedule updates should be accurate but not necessarily precise. This important distinction should focus the effort of the scheduling team (ref. to Chapter 8).
18. **Ensure full traceability of all schedule logic changes.** This will help to support or defend against future claims.
19. **Raise Extension of Time requests as soon as they are known,** through the proper channel as described in the Contract. This will avoid cumbersome debates in hindsight and will ground compensation decisions in current reality.
20. **Understand and compensate for the known psychological biases at play in project schedules.**

Major psychological factors at work in project schedules

- **Parkinson's law:** work tends to fill the time available [if the task is planned for longer than it would take, work will still take at least that duration]
- **Student's syndrome:** if people have time to do a task, they will always wait for the last possible moment to start
- **Commitment syndrome:** people will always 'pad' their duration estimates when they are asked (consciously or unconsciously) to commit to a duration. Hence, they announce durations that can be much longer than what is achievable.
- **Planning Fallacy:** an optimistic bias on the duration of own's future tasks irrespective of benchmark data on past duration distribution of similar tasks (Daniel Kahneman, Amos Tversky).
- **Lack of calibration of estimates:** when people have not calibrated their estimates comparing to actual durations, they will tend to be pessimistic (conservative) for usual tasks and optimistic for unknown tasks.

Index

B

Budget Owners, 11, 133

C

Candidness, 12, 114
Change. *See* Schedule Agility
Contractual Aspects, 185
Convergence Plan, 19, 22, 33,
72, 79, 113, 150
Discipline, 13, 39, 43
Gates, 35
Scalability, 42
Cost of Opportunity, 204
Critical Chain, 152
Critical Path, 16, 17, 68, 85, 88,
101, 106, 152, 205
Critical Path', 145

D

DCMA schedule check criteria,
81, 247
Delays
Concurrent, 202
Cost Impact, 203
Excusable / Non-Excusable, 201
Heuristics. *See* *Project Delay*
Heuristics
Detailed Functional Schedules,
19, 26

E

Earned Schedule Method, 129,
259, 263
Earned Value Method, 259, 260
Extension of Time, 14, 192, 206
Demonstration Methods, 194
Negotiation Strategies, 206

F

Float
Management, 13, 59, 70, 171,
176
Monitoring, 40, 83, 153
Ownership, 13, 189
Schedule Buffer. *See* *Schedule*
Buffer
Showing on Print-Outs, 83
'Virtual Float', 13, 150
vs Buffer, 178

I

Immediacy Principle, 12
Integrated Project Schedule, 12,
19, 23, 45
Alignment with Project
Objectives, 12, 49, 160
Avoiding Intermediate
Constraints, 165
Balance Between Functions, 59,
83
Coding, 62, 89
Level of Detail, 19, 48, 54
Production, 51, 61, 72
Rebaselining, 39, 65, 122, 133
Re-Sequencing, 122
Resourcing, 64, 92, 95
Weighting, 62

L

Last Planner System®, 182

M

Merge Bias. *See* *Schedule*
Resilience / Merge Bias
Monte-Carlo method, 100

N

Navigation

Three Fundamental Questions, 5, 111, 225

P

Physical Progress. See

Schedule Update / Progress Update

Project Delay Heuristics, 157, 173, 251

Project Objectives. See

Integrated Project Schedule / Alignment with Project Objectives

Psychological Factors, 14, 150, 173, 251

Q

Quantitative Analysis

Model Complication, 101

Schedule Statistical Analysis.

See Schedule Statistical Analysis

R

Resource Levelling. See

Integrated Project Schedule / Resourcing

S

Schedule adherence, 182

Schedule Agility, 57, 159, 166

Schedule Buffer, 177, 190
vs Float, 178

Schedule Checks, 81, 94

Ratio Links vs Activities, 87
Update Check, 113

Schedule Consistency, 11, 27

Multiple Schedules, 28

Schedule Contingency. See
Schedule Buffer

Schedule Estimating, 91

Schedule Hierarchy, 12, 15, 253

Schedule Reporting, 79

S-curves, 79

Schedule Resilience, 13, 106,

152, 171

Intrinsic Optimism, 172

Investment, 109

Merge Bias, 89, 107

Schedule Statistical Analysis,
100

Limits, 102

Method, 101, 103

Objective, 100

Schedule Update, 111, 226

Accuracy vs Precision, 115

Failures, 117

Forecasting, 13, 125, 135, 230

Progress Update, 111, 113

Simplified Project Schedule, 19,
24, 101, 113, 200

T

Tendering Schedule, 53, 67

V

Virtual Float. See Float

Visual Management, 37



Project Value Delivery,

a Leading International
Consultancy for Large, Complex
Projects

This cutting-edge Project management book is sponsored by Project Value Delivery, a leading international consultancy that **“Empowers Organisations to be Reliably Successful in Executing Large, Complex Projects”**.

Part of our mission is to identify and spread the world-class practices that define consistent success for Project leadership. Ultimately, we want to be able to deliver a framework that makes Large, Complex Projects a reliable endeavor.

Our Book Series are a crucial part of this framework, spreading indispensable good practices and skillsets for leaders in Projects.

Our approach to Project success

At Project Value Delivery we believe that Project success is based on three main pillars which require specific sets of skills and methodologies specific to Large, Complex Projects. All three need to be strong to allow for ultimate success:

- Project Soft Power™ (the human side)
- Systems
- Processes

We focus on embedding these skills and methodologies in organisations through consulting, coaching and training appointments. We develop what organisations need and then help them implement it sustainably, transferring the knowledge and skills.

We recognise that to be effective, our interventions will involve access to confidential business information and make it a point to treat all information provided to us with the utmost confidentiality and integrity.

Our Products

Our products are directly related to our three pillars. We have developed proprietary methods and tools to deliver the results that are needed for Large, Complex Projects. In a number of areas, they are significantly different from those conventional Project management tools used for simpler Projects.



We focus on consulting, coaching and training interventions where we come in for a short to medium duration, analyse the situation, develop customised tools if needed, and transfer skills and methods to our clients so that they can implement them in a sustainable manner.

Contact

Contact us to learn more and get great resources for free!

Contact @ ProjectValueDelivery.com, and visit our website **www.ProjectValueDelivery.com** where you can register to receive regular updates on our White Papers.

We Empower Organizations to be Reliably Successful In
Executing Large, Complex projects.
Discover more on
www.ProjectValueDelivery.com