highways england

An Introduction to the **Collaborative Planning System**

Foreword

Highways England has three imperatives :

Safety - our aim is that no one should be harmed when travelling or working on the strategic road network. We care about each other, our suppliers, our customers and communities.

Customer Service – improving how what we do impacts those that use the roads.

Delivering the Road Investment Strategy – on time and efficiently.

Lean principles provide a foundation to help enable all of these priorities to be achieved and our Lean approach will provide the skills and tools that support our organisation and those of our supply chain partners

We need to be bold and challenge some of our current practices, working with our suppliers to continuously improve. This is the basis of the Lean Division's work. This strategy document sets out how Lean will help us to deliver the RIS efficiently, whilst improving customer service and most importantly, doing it all safely.

Jim O'Sullivan – Chief Executive

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About this Guidance Note

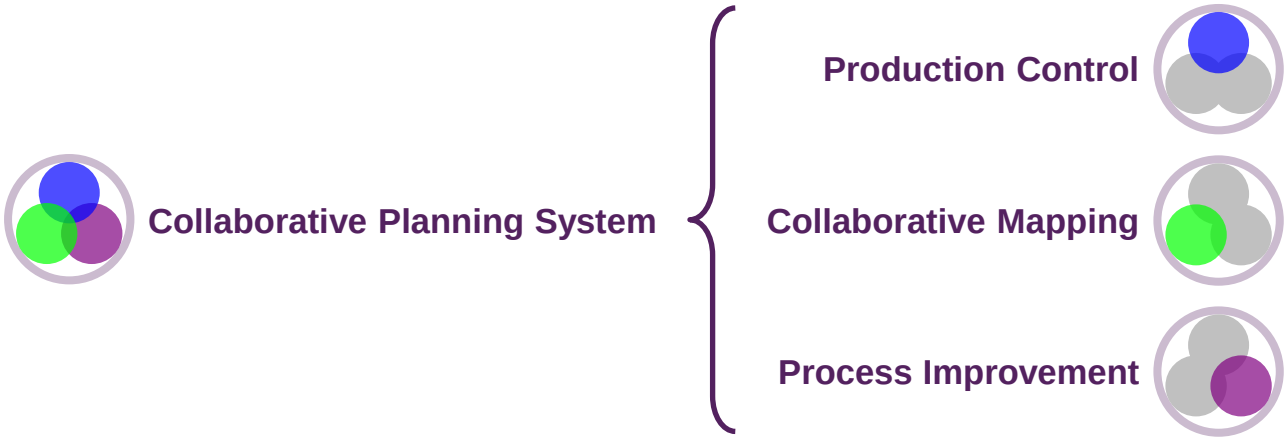
This guidance note is intended to provide an introduction to the concepts behind the **Collaborative Planning System**, a technique based on lean methodologies.

It is aimed at members of the highways industry that already have a basic understanding of lean principles and wish to implement the use of the **Collaborative Planning System** within their own organisations.

The **Collaborative Planning System** complements other lean techniques including **Lean Visual Management** (see **Enhancing the Collaborative Planning System** on page 27 of this guidance note).

Navigating this Guidance Note

This guidance note uses colour coded page markers to easily distinguish between the different sections of the document. These correspond with Figure 1 on page 5 of this document and can be found in the top right hand corner of each page.



Introduction and Opportunity

Introduction

The **Collaborative Planning System** consists of a series of tools, approaches and processes that can be easily implemented on projects.

The **Collaborative Planning System** supports:

- Delivering better value to the customer to increase satisfaction
- Removing waste from work processes to reduce time and cost

Industry Challenge

When measured, construction projects typically operate at between 55 and 60% next day task completion reliability (see www.leanconstruction.org), ie construction today achieves just over half of what is planned to do 24 hours earlier.

Typically when task failure occurs, one or more elements required to execute the planned task may not be in place, eg design, approvals, materials, plant, labour.

Additionally construction work processes and interfaces are often viewed as wasteful. Studies have hypothesised that as much as 50% of man-hours and 20% of all materials are wasted or non-value-adding (Latham,1994 and Egan, 1998).

Industry Opportunity

The opportunity exists to improve reliability to 80 and 90% plus (levels achieved in manufacturing) which enables:

- More work to be done with the same resource
- Reduced programme durations
- Learning to be captured
- Time and money to be saved whilst improving the quality of the delivered product

What's in it for You?

The Benefits of the Collaborative Planning System

The implementation of the **Collaborative Planning System** promotes hard and soft benefits in design and construction on projects when executed effectively:

Hard Benefits include:

- Better reliability of task completion leading to better productivity
- Reduced cost by doing more work with the same resource
- Reduced time durations (improvements of between 10 and 40% are not uncommon when the **Collaborative Planning System** is implemented properly)
- Work process improvement
- Transparency of progress, process and interfaces
- Better integration of teams, disciplines and suppliers

Soft Benefits include:

- Better collaboration and partnering environment
- Better teamwork across company and discipline boundaries
- Learning and continuous improvement environment
- Simple tools and approaches facilitating knowledge transfer
- A more trusting work environment

What's in it for You?

'…the Collaborative Mapping process acted as a focus for all parties to the project going forward and contributed to the successful publication of Draft Orders, despite an extremely tight programme…'

Jacobs, M1 Junction 19 Improvement

'…the Collaborative Mapping sessions were a very powerful tool that allowed us to focus on productivity improvement and secure the commitment of everyone involved. This contributed to delivering the project nearly 7 months ahead of schedule…'

VINCI Construction Grands Projects, M1 Widening J25 to J28

"…Production Control and Collaborative Mapping has been beneficial in integrating our daily construction activities and driving out waste in the production process. Through seeing a 10% improvement in our reliability we have increased site productivity, achieved significant cost savings and reduced overall programme duration"

Costain, M53 Bidston Moss Viaduct Strengthening

'…Collaborative Mapping encouraged good communication between teams and subcontractors and the quality of programming was seen to increase…'

Balfour Beatty, A421 Improvements: M1 J13 to Bedford

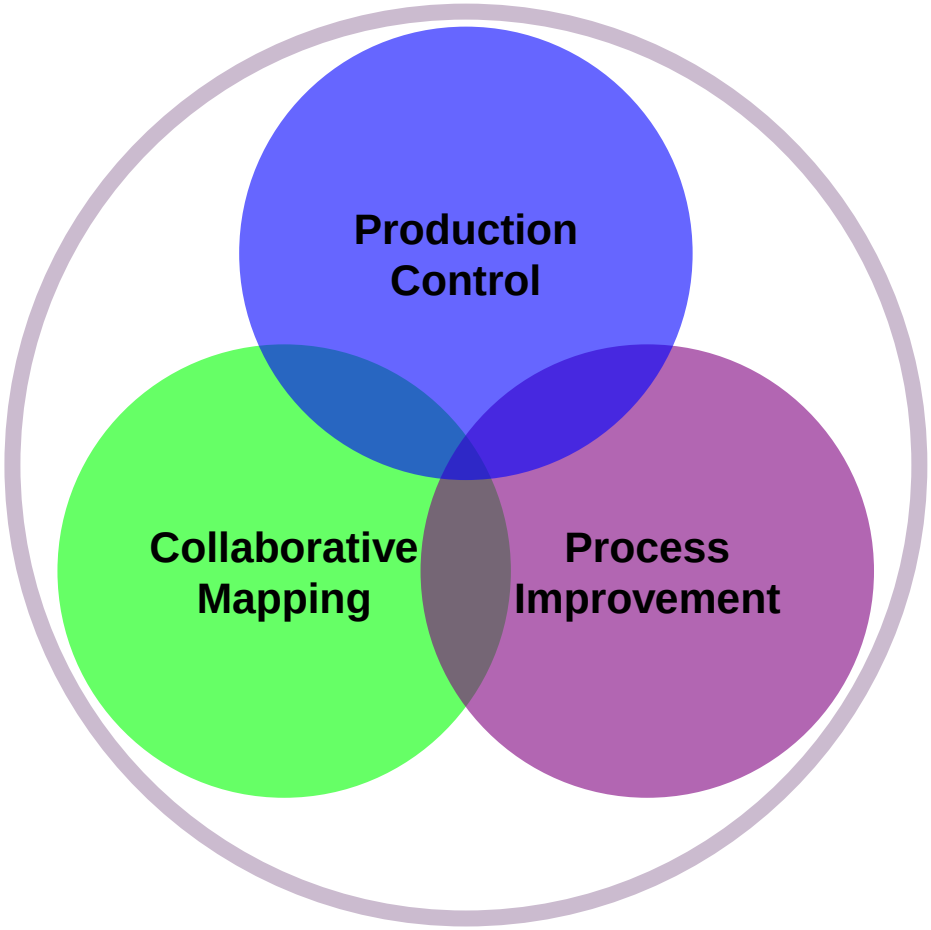
What is the Collaborative Planning System?

The **Collaborative Planning System** is about enabling teams to deliver the same amount of work but with less resource. It involves doing three things:

- **Production Control -** Enabling better productivity through effective resource and information management
- **Collaborative Mapping** - Enabling better planning through the creation of process-based lookahead programmes
- Seeking continuous **Process Improvement** through the implementation and adoption of continuous improvement tools

The adoption of the above techniques has been proven to generate rapid improvement in team performance.

Figure 1 The Collaborative Planning System



Creating the right environment

As its name suggests, the **Collaborative Planning System** is based around collaboration, with teams working together to achieve clear shared goals. Subsequently, the **Collaborative Planning System** works best when:

- A collaborative form of contract exists that promotes improvement
- Project leadership encourages and demonstrates working together
- Project incentives are focused on improving the overall outcome
- Project goals and the criteria for success are clearly defined
- A lean practitioner facilitates improvement
- All stakeholders contribute and are engaged in participation
- Teams are willing to positively embrace transparency
- Teams are prepared to be constructively honest yet direct with each other
- There is a commitment by all to learn
- A designated area is available to facilitate teams coming together
- Good facilitation skills are available to keep meetings concise and focused
- There is a willingness to jump in and learn by participation

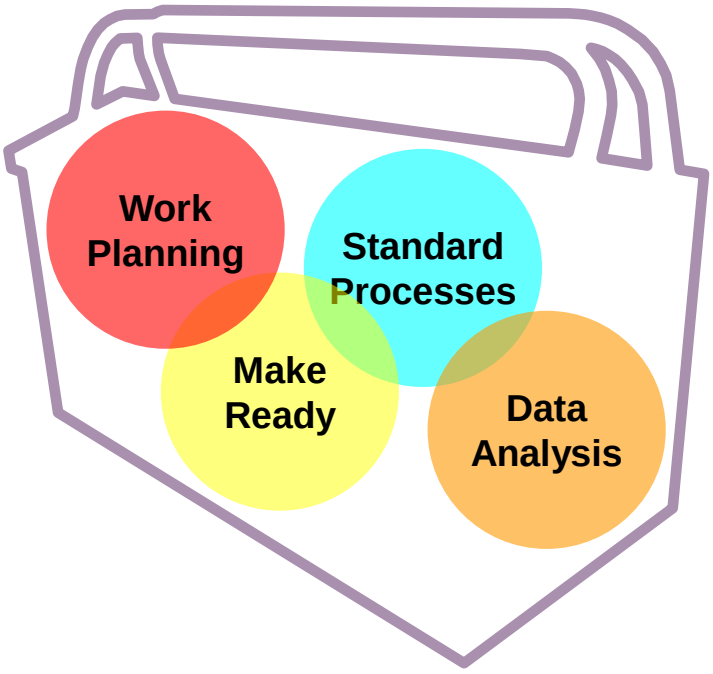
What is Production Control?

In order to do work many things (information, labour, plant and materials) need to arrive at the right place at the right time in the right sequence. **Production Control** is the means by which we manage these inputs, controls and resources to achieve efficient delivery.

The **Production Control** toolkit consists of:

- **Work Planning** - Get the team to meet regularly to create **Work Plans**, by using the Plan-Do-Check-Act cycle, and focus on making and keeping reliable promises - say what we do, do what we say - measuring and learning as they go
- **Make Ready** - Encourages the team to understand and remove the blockers stopping them from doing work before starting the task at hand
- **Standard Processes** - develop and re-use standard ways of doing repetitive tasks. The way teams do tasks often repeats but the volume of work in execution might change
- **Data Analysis** - Uses measurement and learning to inform the areas to improve performance and do process improvement

Figure 2 The Production Control Toolbox

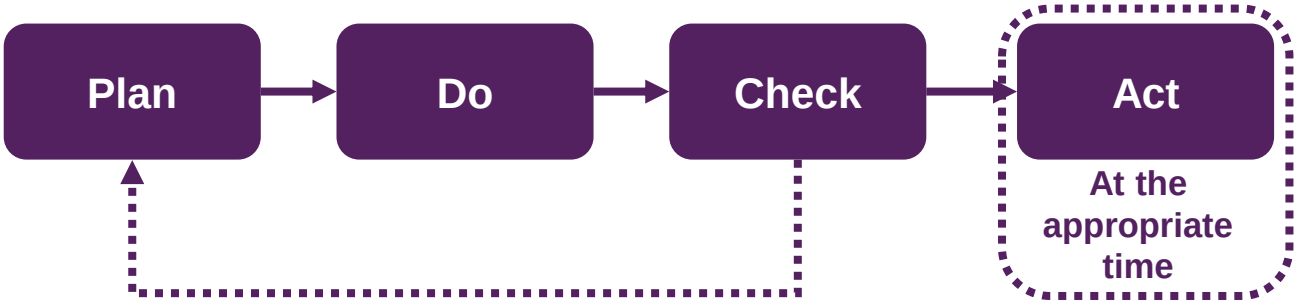


Work Planning

Cross discipline teams come together at regular intervals (weekly in design, daily in construction) to hold production meetings and create collaborative work plans in order to:

- Individually commit to tasks and be measured on successful, reliable task completion
- Understand dependencies with other team members
- Capture reasons why tasks are not achieved for learning and improvement

Figure 2 The Plan-Do-Check-Act cycle



The Production Meeting

- Projects are broken down into appropriate ‘chunks’ of production
- Cross-functional team members are briefed and organised to attend
- Individual team members rapidly report status of previous plan’s tasks - task done / not done using a rigid yes / no criteria, eg 90% done is a no
- Reasons for non-completion are captured, eg material unexpectedly out of stock
- The team then sets the next period’s tasks, ensuring they are realistic, specific and measurable, eg complete installation of 50 linear metres of kerbing on the northbound carriageway between chainages 250 and 300
- Team members make realistic task commitments - only committing what is fit and ready to do

- Team debates commitments to ensure tasks are integrated and achievable
- Meetings should last no longer than 25 minutes in construction and 45 minutes in design
- Data is captured in an appropriate **Production Control** tool (see **Appendix A**)

The focus of the team is to maintain a high reliability of task completion whilst also maintaining, or improving, on programmed targets.

Key Measurements

The key measure taken from production meetings is the **Planned Percentage Complete** (**PPC**) or reliability measure. This effectively measures commitment reliability and is captured along with **Reasons for Non-completion** of tasks for learning and improvement.

$$PPC(\%) = \frac{Number\ of\ planned\ tasks\ completed}{Number\ of\ planned\ tasks} \times 100$$

The benefits of Work Planning

- Teams immediately have transparency of work in hand & progress
- Team members quickly become better integrated and better understand dependencies
- Reliability (**PPC**) measure improves - more work getting done with the same resource
- We start to understand, and improve, the blockers to getting work done
- Communication and clarity of objectives improves

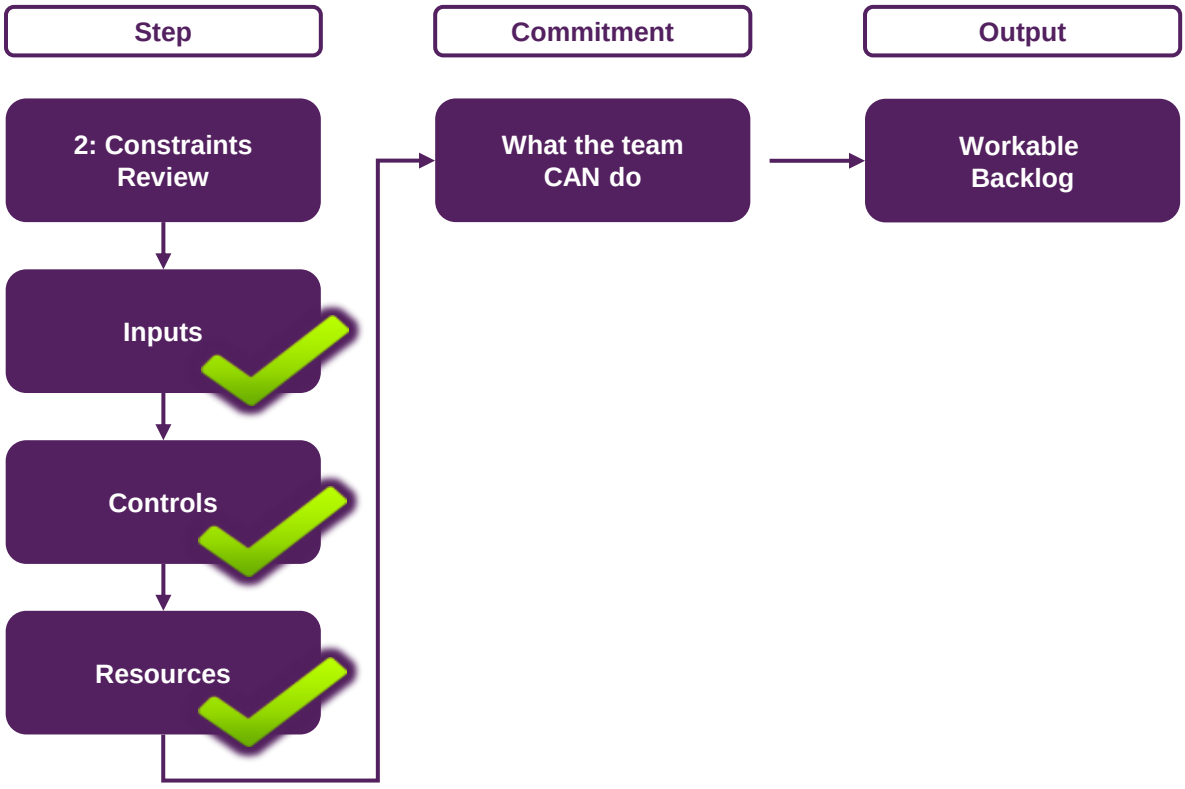
Make Ready

There are often numerous constraints that must be removed before a particular work activity can begin. In **Production Control** we refer to this as making tasks ready, or **Make Ready**.

Teams are facilitated in meetings to map and agree what enabling activities are required to un-constrain tasks and get production moving.

A task is made ready when all inputs (eg material), resource (eg labour) and controls (eg specification) are in place. **Make Ready** enables a 'workable backlog' of work that is fit to be included in work plans.

Figure 3 Make Ready



Make Ready activities are identified in facilitated **Collaborative Mapping** sessions (see page 15 of this guidance note) which help team members to map their processes and better understand constraints and what needs to be done to remove them. Actions to remove task constraints are added to **Work Plans**. Using, and re-using, standard processes with mapped and understood constraints (see the next section)

The benefits of Make Ready

- Reliability improves as tasks are ‘fitter’ to go and do
- Teams will really understand what they need to prepare and control to make their work fit to do
- Abortive work will be reduced
- More work will get done with the same resource

Standard Processes

Generally, the majority of highway construction activities can be demonstrated as being repetitive in terms of the steps taken to do them regardless of the volume of work involved. The opportunity therefore exists to standardise the steps and understand the constraints and enablers that respectively prohibit and allow work to be completed successfully and then repeat as required.

How does Standard Processes work?

Teams utilise **Collaborative Mapping** (see page 15 of this guidance note) to plan all of the steps they are required to take to execute standard work.

Once mapped the standard processes can be used, and re-used, with mapped and understood constraints to ensure dependencies and requirements are fully understood.

Teams capture and iterate the processes as improvements are suggested and implemented.

The benefits of Standard Processes

- Reliability improves as tasks are ‘fitter’ to go and do
- Teams really understand what they need to prepare and control to make their work fit to do
- Abortive work is reduced
- Design and construction processes will become consistent and robust as they become standardised across projects and organisations
- Learning is captured, iterated and consistently applied
- More work gets done with the same resource

Data Analysis

- The production control approach generates robust performance data
- This provides the starting point for process improvement (see page xx).

How does Data Analysis work?

As part of the production control process data is captured as follows:

- Reliability (**PPC**) information - running average & actual of tasks completed versus tasks planned
- Reasons analysis - data captured at the workface to describe the reasons category for why tasks are not complete, eg design awaited, weather, plant breakdown (See **Appendix B** for more information)
- Root cause analysis - the review of reasons for non-completion of tasks to establish underlying reasons (root causes) of failure. Typically uses **5 Why’s** (see **Appendix C**)

The benefits of Data Analysis

- **Process Improvement** efforts will have real data with which to initiate analysis
- Trending is easy to do with data being highly relevant and specific to the teams at hand
- Data collected will rapidly point to where improvement efforts should be focused
- The data has been collected in a transparent, collaborative manner and should be regarded as accurate by the team
- Data is bespoke and specific to the project at hand - highly relevant
- Data provides factual basis for determination of Compensation Events

Figure 4 Planned Percentage Complete

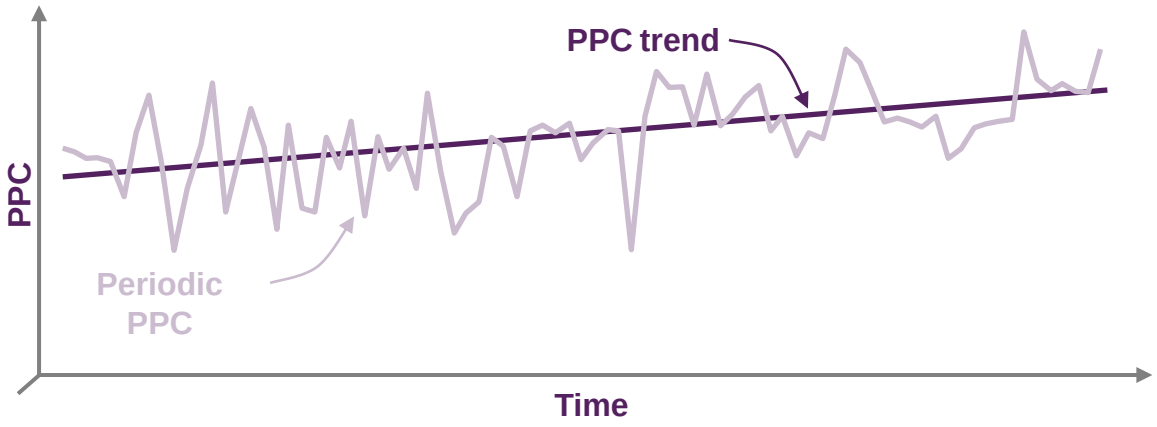
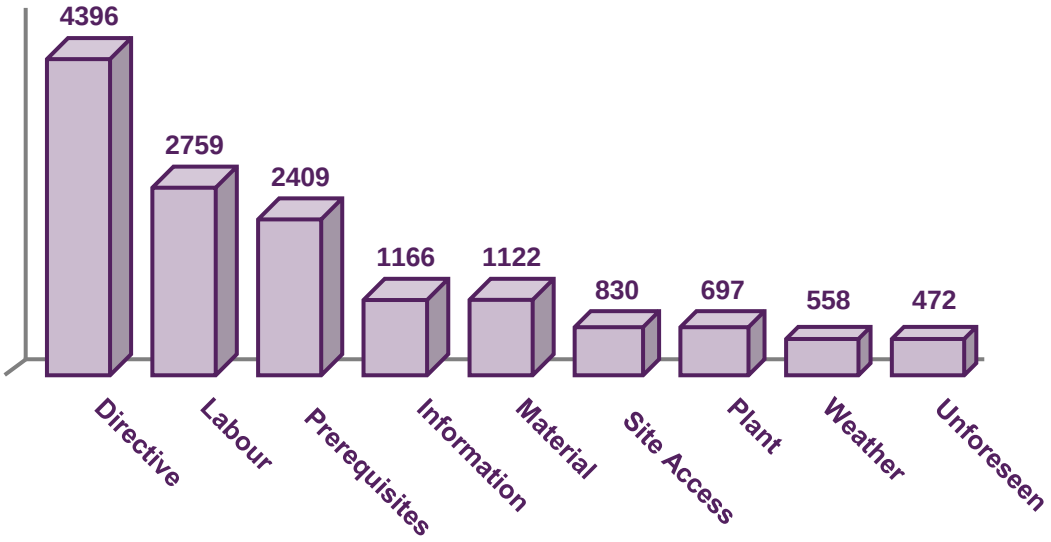


Figure 5 Reasons for Non-completion



Production Control - What's Different?

The team creates a plan together as an integrated team to:

- Get better transparency and understanding of who is doing what
- Make agreements and commitments as a team
- Create some peer pressure to get tasks done

Measurement:

- Simple and clear measurement encourages team members to make reliable commitments
- Reliability encourages a 'do what we say' culture

Additionally:

- Production control planning is done by the foremen / engineers and sub-contractor supervisors who deploy and manage the resource
- The process gives Foremen better process and tools to do their job
- Shorter planning cycle - by planning daily in construction and weekly in design variation and change in the plan is reduced, creating the chance of 'saying what we do - doing what we say'
- The system is a toolset to enable production improvement and is designed to be collaborative
- Encourages communication, trust and transparency from the team members around the table. Issues and problems are volunteered by all parties and dealt with collaboratively and in a timely manner - rather than uncovered as a major problem at the last minute
- The process drives better behaviours - openness, transparency, trust, teamwork and collaboration

What is Collaborative Mapping?

Collaborative mapping is a process designed to:

- Engage cross discipline teams in creating an agreed medium to long term look ahead
- Get team members from different companies, and / or disciplines, to work together and aim for goals for the good of the project
- Enable team members to have transparency and understanding of other's constraints and drivers
- Build and foster team spirit and collaborative behaviour
- Provide an environment and framework that allows team members to collaborate and negotiate with each other in a proactive and productive way

Collaborative mapping can be used at a strategic level (whole programme), and at a tactical level (phase, area, next milestone, next 12 weeks, next 6 weeks).

How Collaborative Mapping works

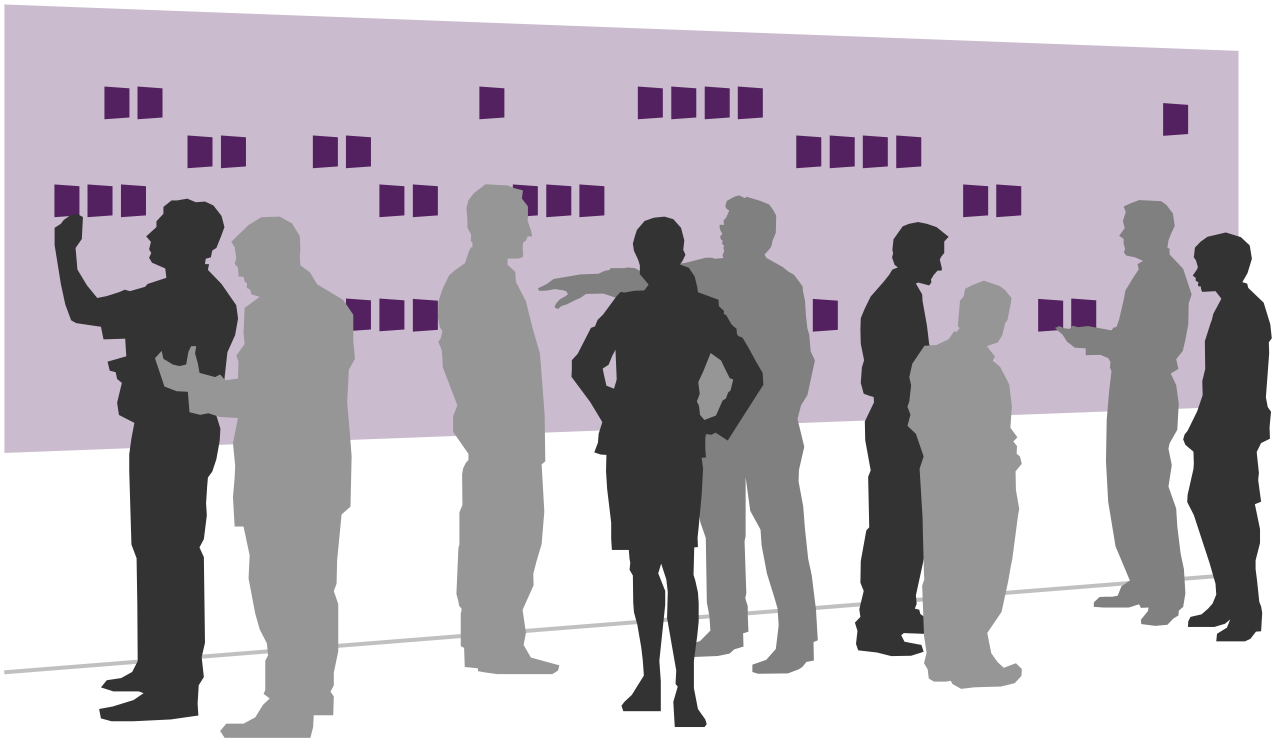
The key steps in running successful collaborative mapping sessions are:

- Make sure that everybody who is involved in controlling the actual work (eg sub-contractor foremen) or has a stake in success of the work attends
- Create the right environment for the session. The session should:
    - Be facilitated by somebody experienced and largely neutral who can create an open, relaxed environment but co-create and implement robust ground rules to get the best out of everybody at the session.
    - Be carried out in a large room provided with blank wall space, paper and Post-it notes
    - Have room to move around with refreshments at hand

Running the **Collaborative Mapping Session**:

- Keep introductions to a minimum
- Focus on putting the team to work as quickly as possible
- Be clear as to the purpose of the session - to leave the room with an agreed sequence of works that has team buy-in and understand any enablers / constraints needed to ensure success
- Initially focus on the target for the team and clearly describe what this looks like so everyone is clear. Ideally select an interim milestone or handover to focus the team's efforts
- Works backwards from the milestone and insert a colour coded Post-it note, by discipline / team member for each step
- Capture constraints / enablers on the map, or separate list, so that all team members are clear and aligned

Figure 6 Collaborative Mapping Session



It is important to allow facilitated debate and negotiation within the session to get consensus on the process steps - the team should leave the room feeling engaged in the process and session, not feeling bullied into agreeing something.

Outputs of the session

Key output includes:

- A clear map of integrated colour coded steps
- Timescales clearly understood and captured
- Constraints and enablers clearly understood and captured
- Side agreements clearly understood and captured

Next steps

- Agree how the team are going to control against their agreed progress and commitments - run production control sessions (see page 8)
- Agree follow up sessions. These will be timed to suit elements of work, or simply on a rolling programme of between 4 and 10 weeks depending on the type and size of the work

The benefits of Collaborative Mapping

Benefits associated with **Collaborative Mapping** include:

- The early introduction and engagement of key stakeholders
- The early development of interpersonal relationships and a collaborative working environment
- Early programme buy-in and agreement of project milestones
- The early identification of interdependencies and sequencing issues
- The early clarification of front-end requirements

- The early promotion of two-way responsibility and accountability
- The early identification of programme-related risks and opportunities

Ultimately, the process will:

- Reduce programme duration
- Improve collaboration, transparency and understanding
- Better integrate suppliers
- Reduce time and cost

Collaborative Mapping - What's Different?

- The team creates a look ahead plan together as an integrated team to:
  - Get better transparency and understanding of who is doing what
  - Make agreements and commitments as a team
  - Understand the mutual dependencies and interactions
- Collaborative planning is done by the Designers / Foremen / Engineers who deploy and manage the resource
- The process is all about doing work better by giving the team better process and tools
- Encourages communication, trust and transparency from the team members around the table
- By working to clearly define and agree the team's target and the steps to achieve it - the process drives alignment in a collaborative way
- By focusing the team on a target, and asking them to collaborate in a proactive way to achieve it, time can generally be removed from planned activity durations
- The process drives better behaviours - openness, transparency, trust, teamwork and collaboration

What is Process Improvement?

Process Improvement is the action or actions that are taken to improve existing processes so that they are able to meet new goals, objectives or targets. It should involve dedicated and rigorous continuous improvement activity focused around the use of specific **Process Improvement** tools.

There are a number of different tools and techniques available that can be used to help deliver **Process Improvement**. Two examples of these are:

- Blitzes
- DMAICT

Blitzes are one of the most straightforward process improvement techniques. Generally, a **Blitz** is a one-off brainstorming event, conducted over a short period of time, involving the people who actually do the work, and focused on productivity improvement and the identification of long term waste reduction. The outcome of a **Blitz** is implemented immediately to enable immediate step improvement in performance.

DMAICT is a acronym that stands for Define, Measure, Analyse, Improve, Control and Transfer. It is a structured lean sigma approach that helps teams to:

- Define a recognised problem or opportunity
- Measure the current process and performance
- Analyse the data to identify improvement opportunity
- Determine the optimal solution for improvement and implement
- Maintain and control associated improvements
- Transfer those improvements to other areas of their business

What's Different?

Process Improvement is different to other continuous improvement techniques in that it is based on real problems backed up by real data. The majority of improvement action is generated and implemented by those doing the work, as opposed to senior management intervention.

Implementing Process Improvement

Data drives improvement. Therefore, the first step in implementing any **Process Improvement** is the collection of data, or where no data exists, the creation of data through measurement.

Initial data sources will include:

- Reasons for Non-completion
- Planned Percentage Complete
- Key Performance Indicators
- Other performance measures (see 'An Introduction to Lean Visual Management')

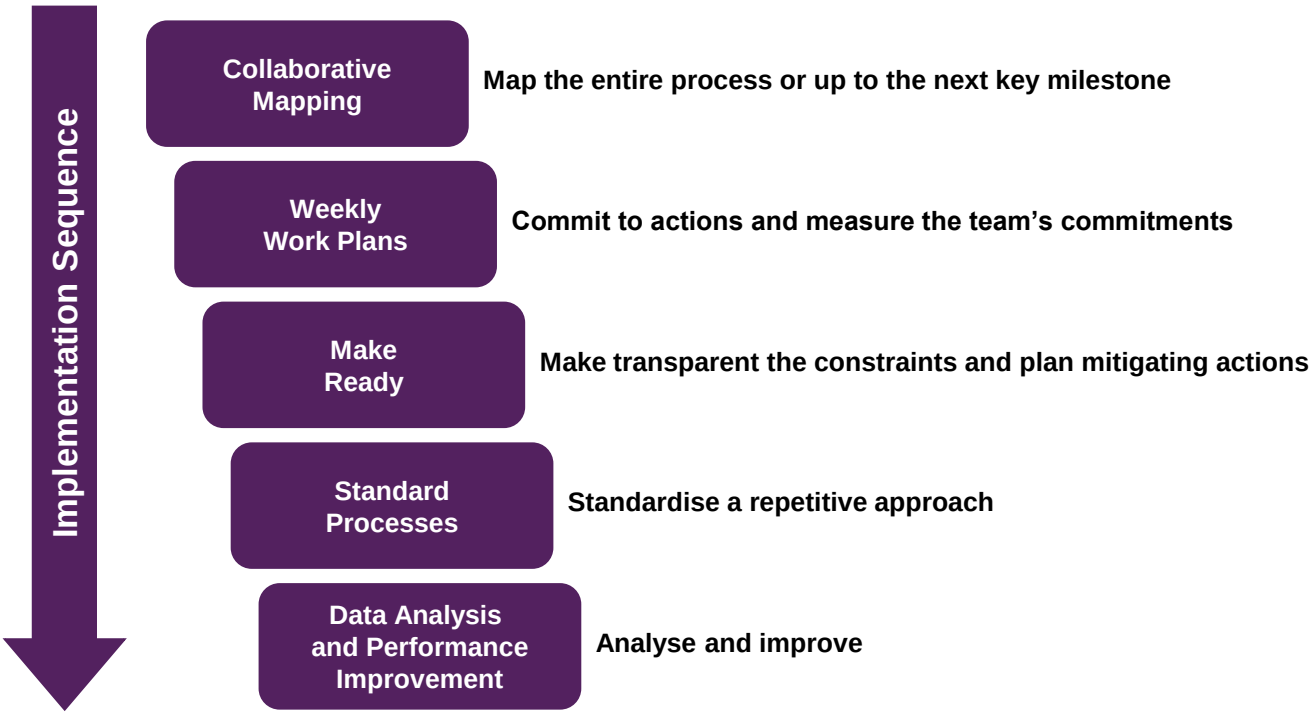
Once a robust set of data has been established it can be used to identify problems and the associated **baseline for improvement**. Generally teams will focus first on the **Reason for Non-completion** with the highest score.

Following identification of the area for improvement, the team then defines the required outcome for the improvement, ie what is the team trying to achieve? Is it a percentage increase in a particular performance measure? Or a performance increase against a particular Key Performance Indicator?

The team then works together to determine a suitable solution utilising the Lean tools and techniques at their disposal. Once that solution is agreed it should be implemented, controlled (through monitoring) and, where successful, transferred to others.

How the experts implement the Collaborative Planning System

The **Collaborative Planning System** in design (single projects):



Step 1: Collaboratively map the design process, or elements of it, so the team understands the target and the steps to deliver it.

Step 2: Get the team into the Plan-Do-Check-Act cycle and the use of **Weekly Work Plans**. Capture reliability (**PPC**) and reasons analysis measurements. Use **Weekly Work Plans** process to drive adherence to the agreed look ahead.

Step 3: Introduce the **Make Ready** process to ensure that the constraints to achieving the tasks are removed to allow reliable task commitment.

Step 4: Develop and implement standard processes for repetitive design processes

Step 5: At the appropriate point undertake **Data Analysis** using the generated data and metrics (**PPC** and **Reason for Non completion**) as a solid guide as to where to start process improvement efforts.

General: Make metrics transparent at earliest, sensible opportunity

Why do it this way?

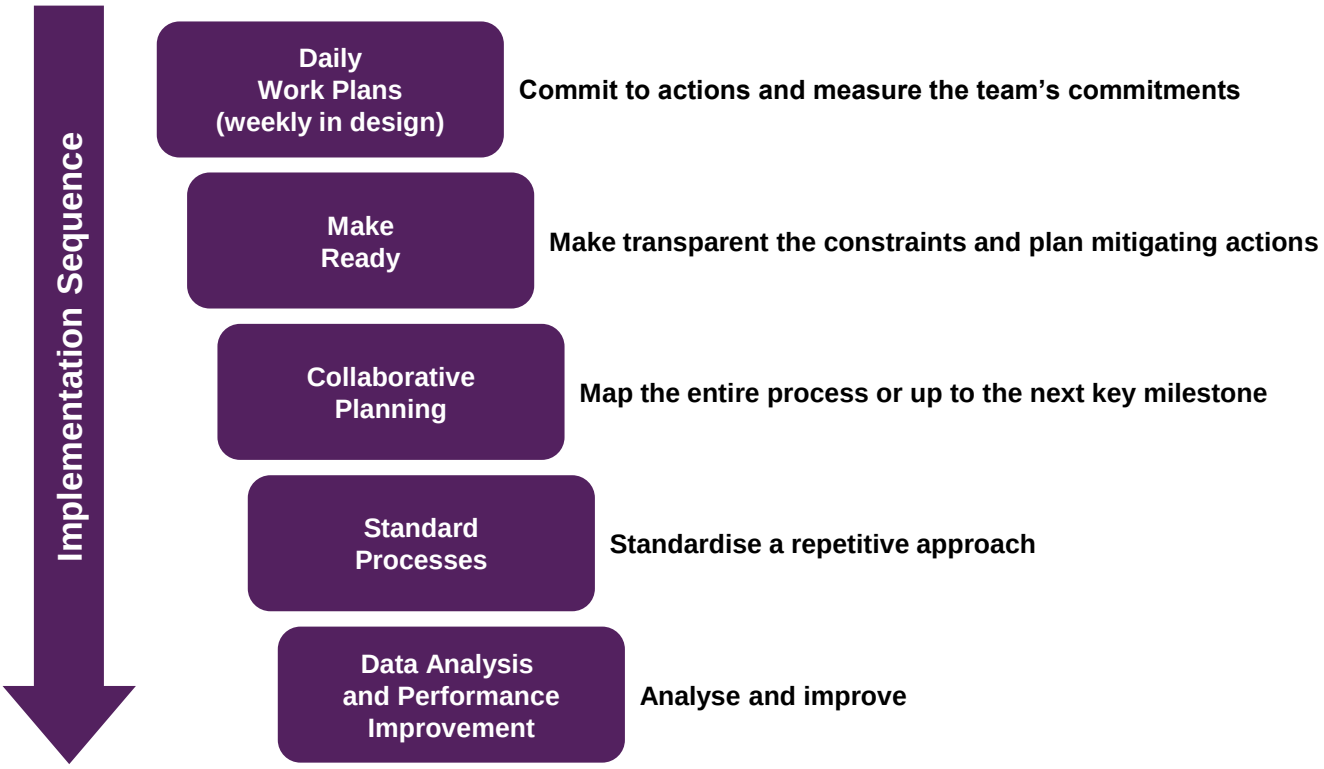
- Design team's get an enormous amount of value from the collaborative mapping process – as it gives them the opportunity to creatively plan whilst understanding their interfaces with all the key stakeholders – both design and otherwise
- Design team's conversely perceive that they get less value from the weekly work plan process. However, in the expert's experience the ability to enforce reliable commitment promises brings significant benefits
- This method gets designers engaged in the process and allows production control to be introduced with the least resistance

Hence, the implementation sequence is:

Do Collaborative Mapping > Do Work Plans > Do Make Ready

How the experts implement the Collaborative Planning System

The **Collaborative Planning System** in construction and small design projects:



Step 1: Get the team into the Plan-Do-Check-Act cycle and the use of **Daily Work Plans**. Capture reliability (**PPC**) and reasons analysis measurements.

Step 2: Introduce the **Make Ready** process to ensure that the constraints to achieving the tasks are removed to allow reliable task commitment.

Step 3: Use **Collaborative Mapping**, or elements of it, so the team understand the target and the steps to deliver it.

Step 4: Develop and implement standard processes for repetitive design processes

Step 5: At the appropriate point undertake **Data Analysis** using the generated data and metrics (**PPC** and **Reason for Non completion**) as a solid guide as to where to start process improvement efforts.

General: Make metrics transparent at earliest, sensible opportunity

Why do it this way?

- Usually the biggest, quickest impact can be made by working with these teams on the detailed work plans - it is where the main resource is deployed and money spent.
- Site teams get most benefit from resolving immediate issues and working out to the medium term
- Getting the team engaged early by working on issues that can be quickly solved is always preferable
- Consequently if the team can make better commitments, understand transparent interfaces and plan more collaboratively, big benefits can be apparent quickly
- In our experience the team must improve its short term planning reliability to have a chance of predictably delivering a collaboratively mapped plan

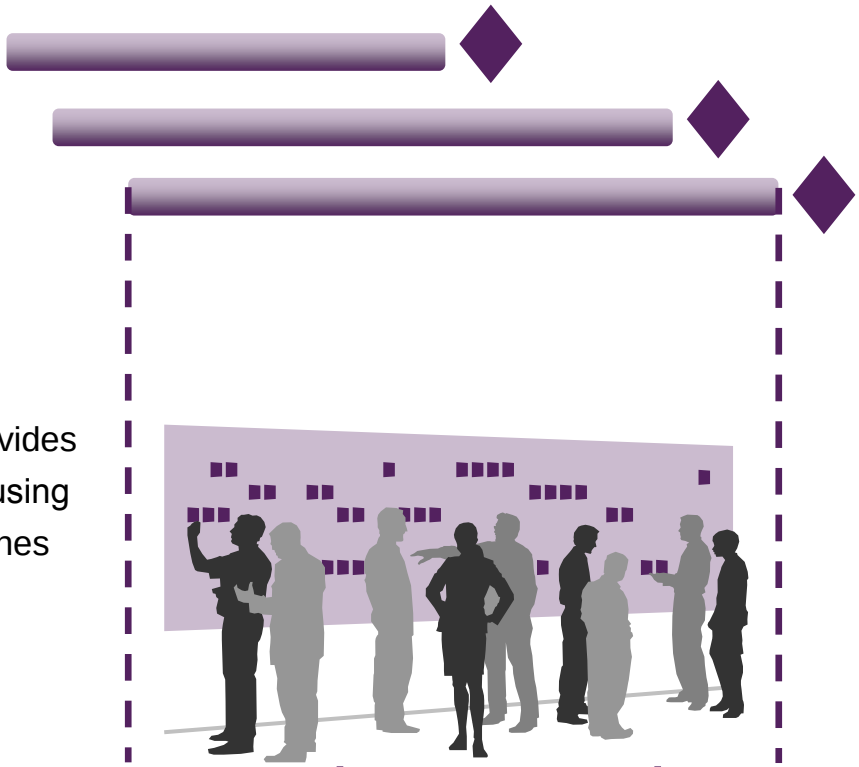
Hence the implementation sequence is:

Do Work Plans > Do Make Ready > Do Collaborative Mapping

Collaborative Planning System and the Contract Programme

The **Collaborative Planning System** should be viewed as an enabler to achieving the aspirations of a robust contract programme - not as the means to replacing it. The graphic below explains the way in which the various levels of planning fit together.

The contract programme Provides the ‘atlas’ high Level view of the project



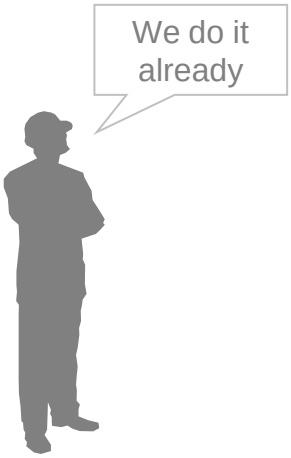
Collaborative Mapping provides the agreed ‘roadmap’ view, using contract programme milestones as the key targets

Work Plans provide the ‘street map’ view, with measurement, to ensure that the team are on plan.

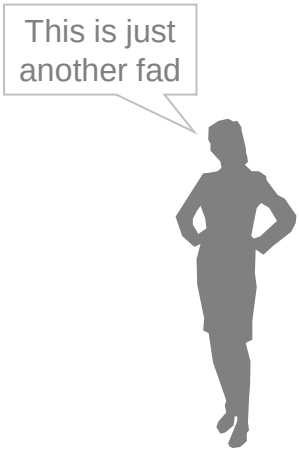
The **Collaborative Planning System** is founded on the belief that to achieve the high level targets the team must achieve high reliability on daily / weekly tasks

Things you might hear

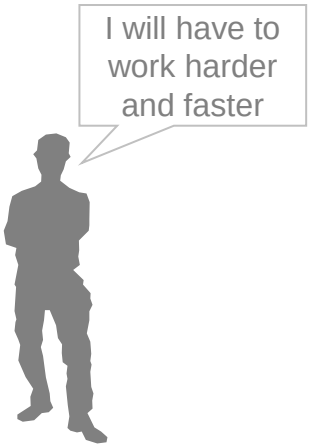
There are a number of things that you might hear when first implementing the **Collaborative Planning System**. These are normally based on the perceptions (and misconceptions) of people before engagement, education and training (which is why these are so important to successful implementation). It is worth remembering that people normally have a healthy scepticism about new ideas that only manifests itself because they want to be sure that those ideas are sound.



Collaborative planning is much more than planners talking to sub-contractors to develop the contract programme. Collaborative planning is about contractors and sub-contractors working together to improve productivity, and reduce time and cost.



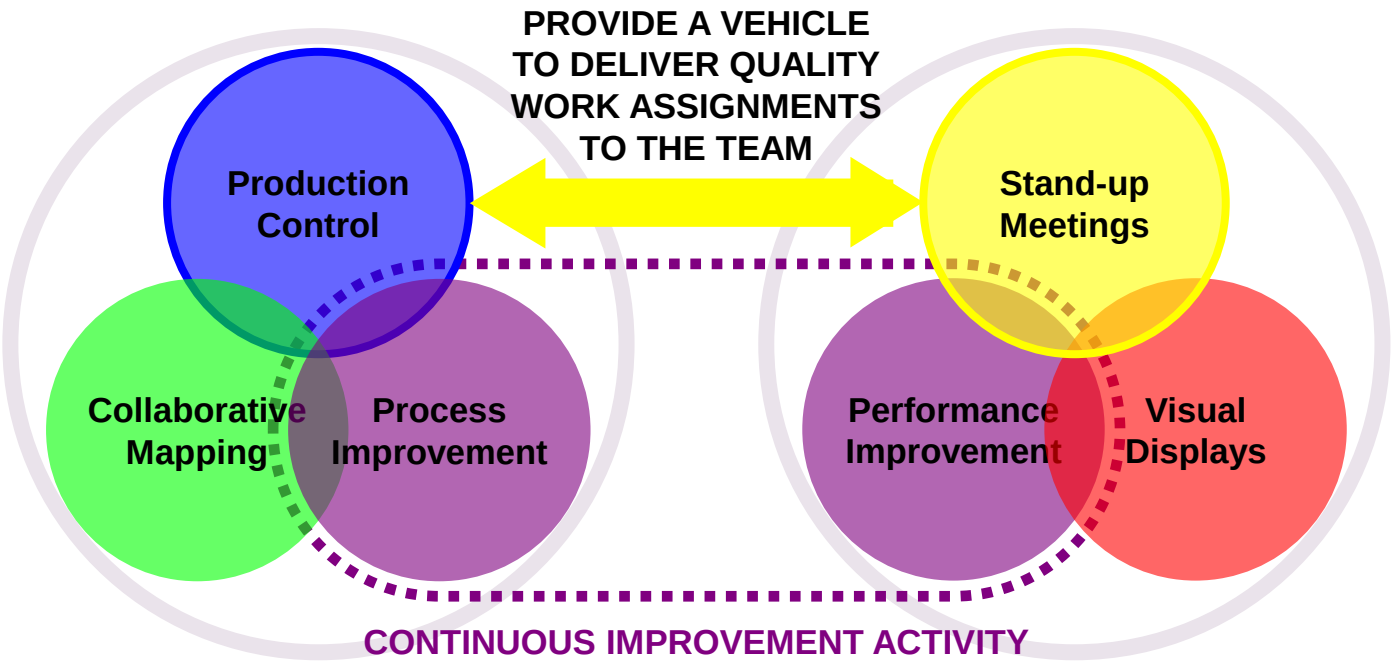
Collaborative planning has been used in construction for nearly 20 years and the productivity improvements achieved to date are well documented (see www.leanconstruction.org).



Lean isn't about increasing the pace of work. It is about increasing productivity by establishing ways in which teams can work more efficiently, both individually and collectively.

Enhancing the Collaborative Planning System

While **Collaborative Planning System** can be used standalone, the benefits it delivers can be enhanced by using it with **Lean Visual Management**. The figure below shows how the two methods work together.



The **Collaborative Planning System** is about **planning to do work**. **Lean Visual Management** is about **putting people to work**.

Production Control and **Stand-up Meetings** work together to set clear production targets and work assignments which can be done.

Process Improvement and **Performance Improvement** are two varieties of continuous improvement.

Collaborative Planning System and **Lean Visual Management** together provide teams with a set of tools with which to add value and reduce waste.

Enhancing the Collaborative Planning System

	Work Plan Meeting	Stand Up Meeting
Why	To integrate & plan between suppliers To ensure we are working in the right areas, on the right things for the good of the project To set the right targets and capture learning To measure & improve	To ensure the workforce is briefed to execute safe production To ensure the workforce is bought into the right targets Capture workforce issues and identify performance improvement opportunities
What	Set and capture discrete, SMART tasks Capture reasons and learning	Buy-in and agree to SMART tasks Check and sign off that everything is in place to do safe production
When	Late PM daily on site	1st thing in the morning before work starts
Who	Supervisors/Foremen relevant management	Supervisors/Foremen, and workers
How	Structured 20-30 minute sit-down meeting	10-15min stand up briefing around visual display board(s)

Appendices

Appendix A: Tools for Production Control

Data generated during **Production Control** meetings can be captured on paper, in Microsoft Excel spreadsheets, or in proprietary computer or web based systems.

This appendix contains a set of templates which can be used to create **Weekly Work Plans**, do **Make Ready** and report **Planned Percentage Complete** and **Reasons for Non-completion.**

Weekly Task Plan

1 Week Task Plan		Week Commencing
Project:		
Team:		
Team Lead:		

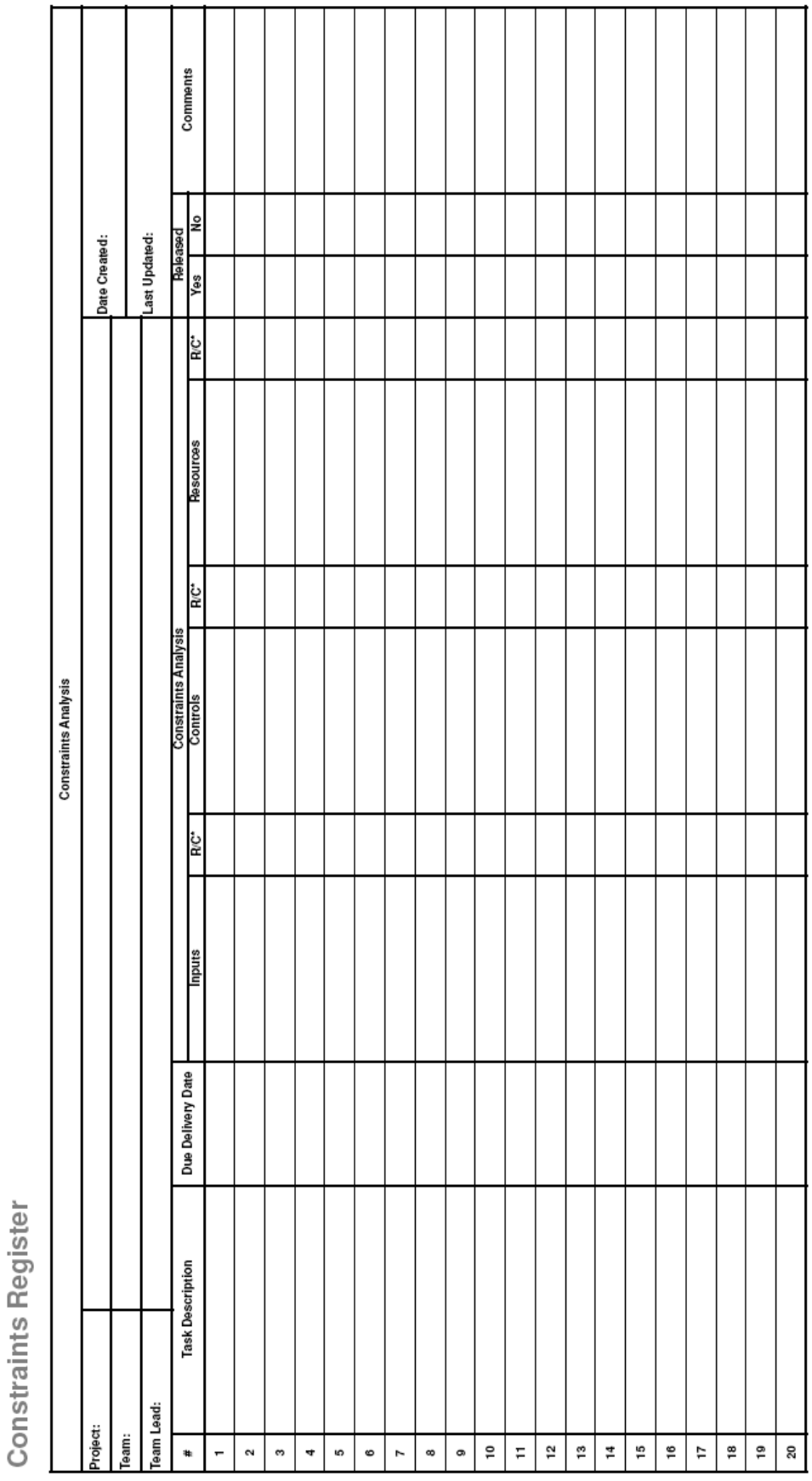
#	Task Description	Pre-task Requirements Work that Can and Must be Done Prior to Starting Work on the Task	Owner(s)	Period to Perform the Work					Completed		Non-completion Analysis Reason for Non-completion
				Monday	Tuesday	Wednesday	Thursday	Friday	Yes	No	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
											PPC* =

Non-completion Categories

- **A** Changed Priorities
- **B** External Input Unavailable
- **C** Internal Input Unavailable
- **D** Missing Client Input/Control
- **E** Missing Internal Control
- **F** Re-allocation of Resources
- **G** Sickness or Absence
- **H** Underestimation

* Percent Planned Complete = $\frac{\Sigma \text{ complete tasks}}{\Sigma \text{ planned tasks}}$

Appendix A2: Make Ready (Constraints Register)



Constraints Register

Constraints Analysis

Project: | Date Created:

Team: | Last Updated:

Team Lead:

#	Task Description	Due Delivery Date	Constraints Analysis						Released		Comments
			Inputs	R/C*	Controls	R/C*	Resources	R/C*	Yes	No	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
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16											
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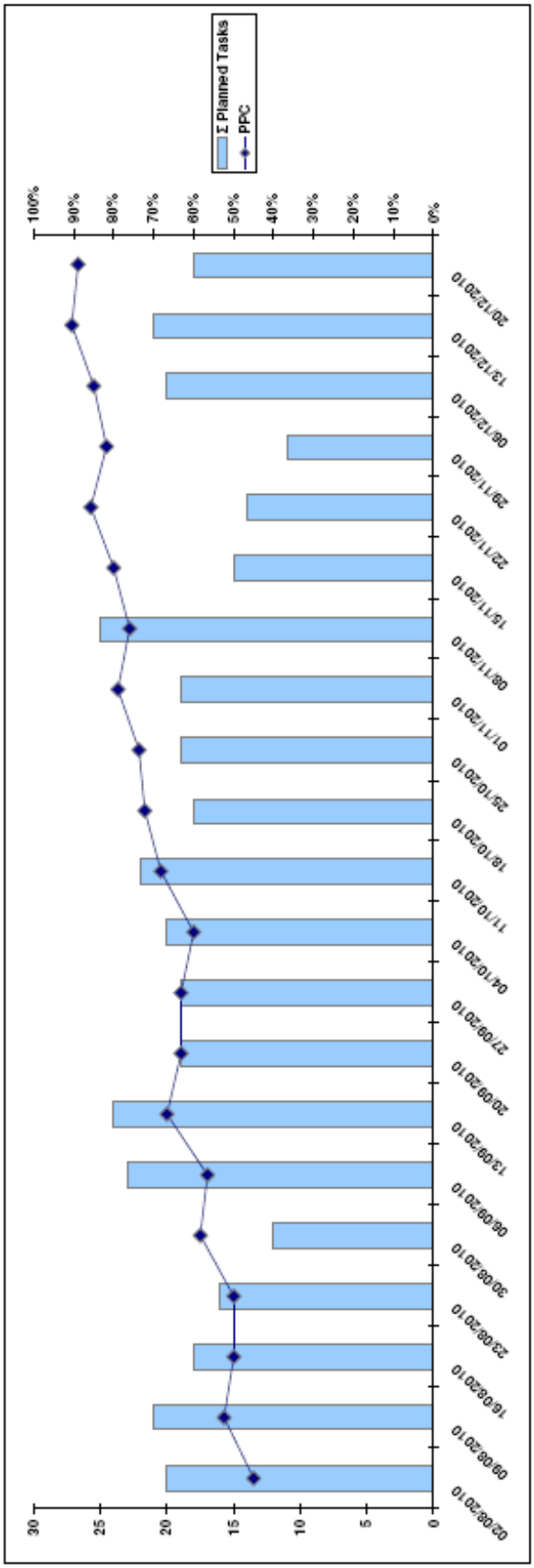
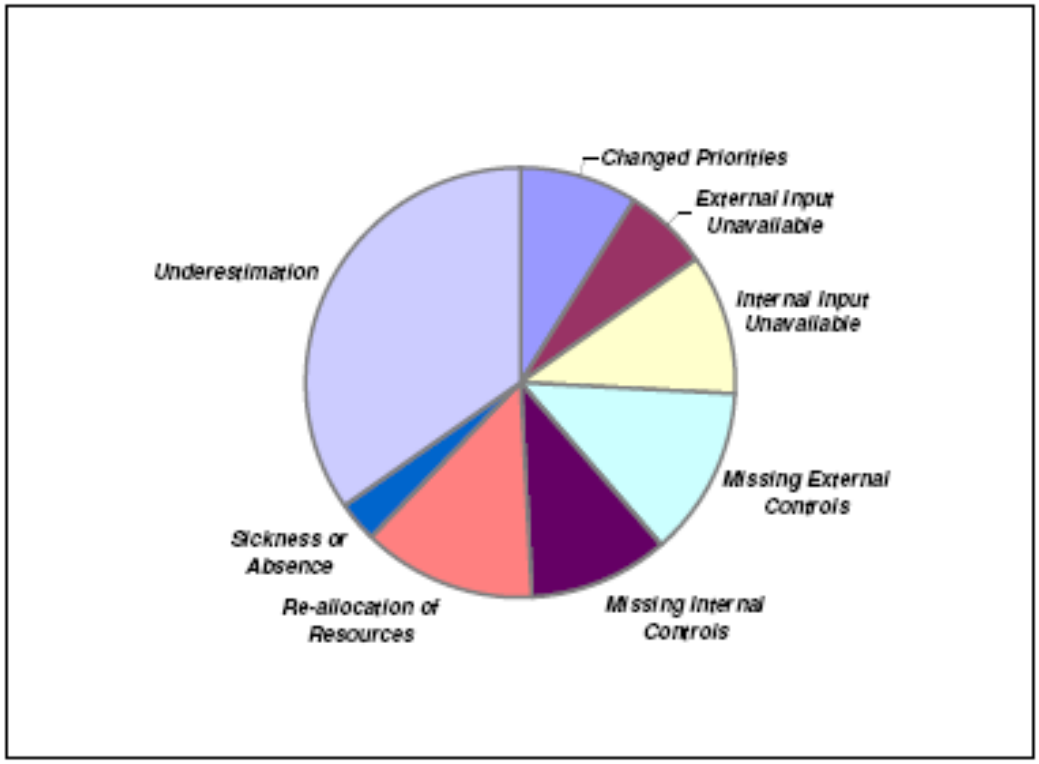
18											
19											
20											

* R/C = Released/Constrained

Appendix A3: PPC Report



Appendix A4: Non-completion report



Non-completion Analysis

	Changed Priorities	External Input Unavailable	Internal Input Unavailable	Missing External Controls	Missing Internal Controls	Re-allocation of Resources	Sickness or Absence	Underestimation
Sub-total	11	8	13	16	13	16	4	43

	Non-completion Category							
Week Commencing	A	B	C	D	E	F	G	H
02/08/2010	1		2	1	2	2		3
09/08/2010	1	1		2		1	1	4
16/08/2010	2		1		2	3		1
23/08/2010			1	2		1	1	3
30/08/2010			2			3		
06/09/2010	2		1	1	1	2		3
13/09/2010		3		1	2			2
20/09/2010	1	1		1		1		3
27/09/2010			3					4
04/10/2010				2	2		1	3
11/10/2010	2				1	1		3
18/10/2010	1		1	2				1
25/10/2010		1			1		1	2
01/11/2010					1			3
08/11/2010		2	1	2				1
15/11/2010						1		2
22/11/2010				1				1
29/11/2010	1					1		
06/12/2010					1			2
13/12/2010				1				1
20/12/2010			1					1

* EDIT SHADED CELLS ONLY

Appendix B: Reasons for Non-completion

To enable subsequent analysis reasons for non completion are categorised under a relatively small number of generalised headings. Typically these may include:-

Directive - For example a required permit is not in place

Labour - Insufficient labour was available

Prerequisite - Something that needed to be in place wasn’t

Information - Drawings or specifications were not available

Material - The necessary material was not available

Site Access - The site was not ready

Plant - The necessary plant was being used elsewhere

Weather - The weather made work impossible

Unforeseen - An unforeseeable event prevented work

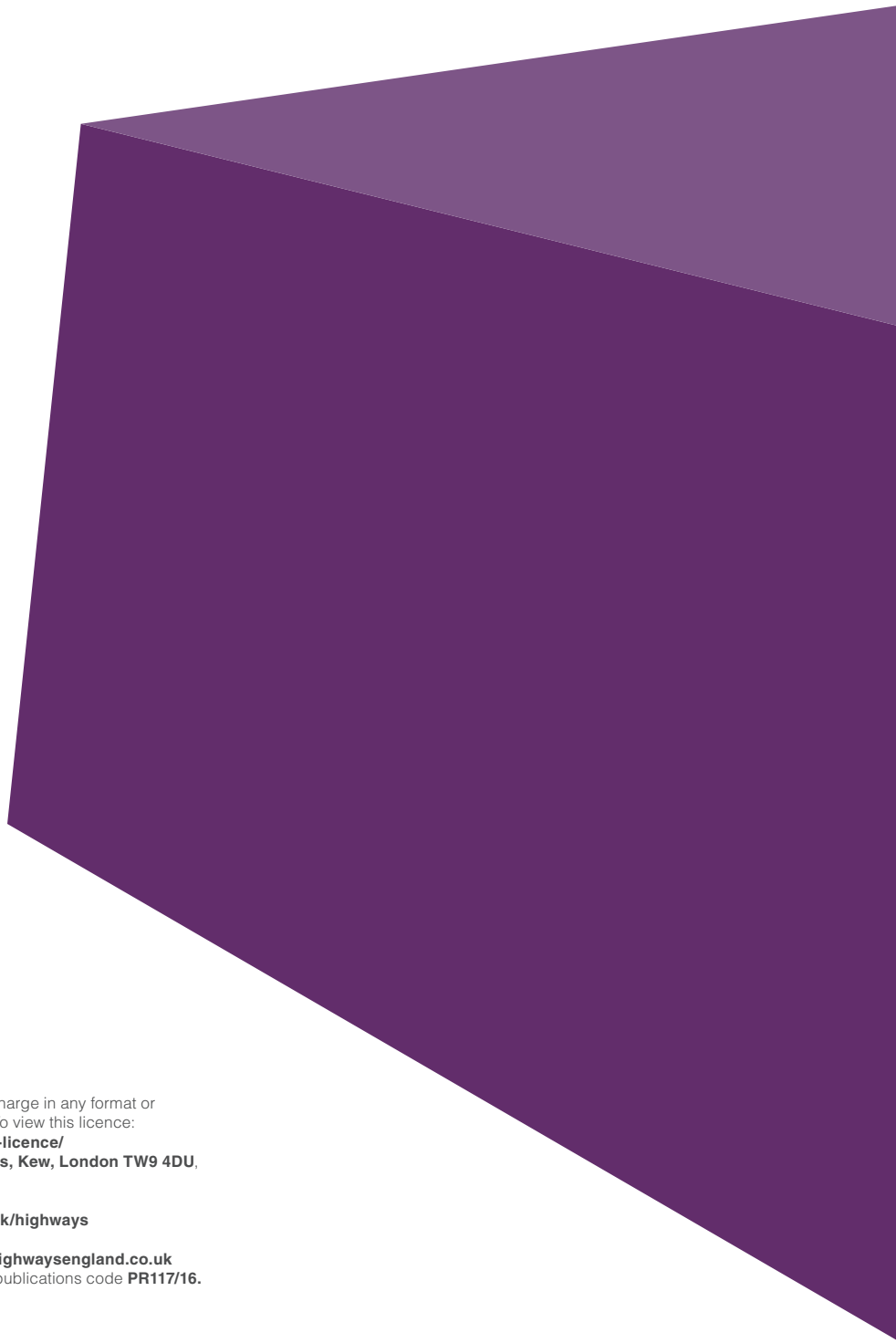
Appendix C: Root Cause Analysis - 5 Whys

5 Whys is a simple and useful tool for drilling down to root causes, and simply involves asking the question why until the fundamental reason for failure is disclosed.

The following example demonstrates the process:

- My car will not start (the problem)
- ***Why?*** - The battery is dead. (first why)
- ***Why?*** - The alternator is not functioning. (second why)
- ***Why?*** - The alternator belt has broken. (third why)
- ***Why?*** - The alternator belt was well beyond its useful service life and has never been replaced. (fourth why)
- ***Why?*** - I have not been maintaining my car according to the recommended service schedule. (fifth why, a root cause)
- ***Why?*** - Replacement parts are not available because of the extreme age of my vehicle. (sixth why, optional footnote)

If you need help accessing this or any other Highways England information, please call **0300 123 5000** and we will help you.



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