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Jacobs leads the global professional services sector, providing solutions for a more connected, sustainable world. Headquartered in Dallas, Texas, with approximately US$12 billion in revenue and a talent force of more than 50,000, Jacobs provides a full spectrum of services including scientific, technical, professional, construction, and program management for business, industrial, commercial, government, and infrastructure sectors. Marking 46 years in Ireland, Jacobs established its first international office outside the USA in Ireland in 1974. Today, the company employs more than 1,100 people across Dublin, Cork, and Belfast.

## Author

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## Overview & Background to the Lean Initiative

Covid-19 continues to have a dramatic impact on the way we work in our industry. Unsurprisingly, it has also had an effect on how Lean thinking and practices are being deployed on Jacobs' projects worldwide. This case study – which is anonymised for confidentiality reasons – shares some of the approaches and solutions that Jacobs is using to minimise disruption to the deployment of Lean thinking and tools on our projects, whilst also continuing to optimise their benefits. It is worth noting that while Covid-19 has caused disruption, there have been some positive aspects, primarily with the shift towards remote working accelerating the integration of digital tools and ways of working.

## Lean Initiative Undertaken – Lean Thinking, Tools & Techniues

### Last Planner® System Thinking & Behaviours

The Last Planner® System (LPS) is probably the most recognised and established Lean practice in the AEC sector worldwide. LPS is a foundational Lean technique that often enables further deployment of Lean thinking and practices within projects and organisations involved in the AEC sector. The primary benefit associated with the successful deployment of LPS is reliable workflow. This enables projects to adhere more closely to agreed schedules and increases the likelihood of them being completed on time. LPS succeeds in enabling more reliable workflow because its deployment unlocks important behaviours and ways of thinking associated with successful collaboration and project delivery, including:

- Higher levels of engagement from trades and disciplines during the planning process. This results in a higher level of shared ownership for the work plans. The teams are more committed because they are engaged and invested in the process.
- Meaningful collaboration between all stakeholders. This includes teams displaying a greater willingness to make requests of other teams or disciplines for things they need to progress their own work, while in turn making firm commitments around tasks that they themselves can deliver. This leads to greater levels of transparency and collaboration compared to teams that do not subscribe to the principles of LPS.
- LPS promotes higher levels of trust across teams. Trust does not emerge in a vacuum, but rather grows where reliable promising exists – a characteristic that is encouraged within the LPS framework. If an individual consistently meets their promises, they become trustworthy. The same thinking applies to trades or disciplines.

• Rather than ignoring constraints – issues that have the potential to prevent work progressing to plan – LPS encourages proactive identification of, ownership for, and removal of constraints. Constraint logs are often employed to support this aspect of LPS deployment.

• Learning and Improvement – the simple process of capturing and categorising the main root causes for failed commitments that is embedded into LPS encourages teams to move beyond blame-oriented behaviours ("who") towards learning and improvement ("why").

• Shared Understanding of Flow and Pull – the closer collaboration that LPS deployment encourages creates a better understanding of the importance of the Lean principles of flow and pull for all parties. These Lean concepts become less abstract, and it becomes more evident to all that having one discipline or trade getting significantly ahead of others can create queues and waiting waste elsewhere.

LPS has become an increasingly prevalent Lean practice within Jacobs' Life Sciences projects worldwide. There is growing recognition within Jacobs and among our client base that LPS deployment yields significant benefits during design and construction phases. On a recent life sciences project, the Jacobs construction management team, together with all key contractors on-site, successfully implemented some of the core principles underlying LPS in a manner that was working well and yielding benefits prior to the emergence of Covid-19. The challenge for the project team was to successfully migrate some of the LPS practices on the project to remote working, without diluting any of its key benefits, following the adoption of social distancing measures and new working practices necessitated by Covid-19.

## Adapting Last Planner® System Implementation to Covid-19 Challenges and Remote Working

• Digital Weekly Planning & Lookahead Meetings – A key element of LPS implementation is the weekly planning and lookahead meeting. Pre-Covid-19, this meeting was a traditional face-to-face meeting attended by the Jacobs construction team and representatives from all project contractors engaged on-site. The meeting has since migrated to a virtual meeting format using Microsoft Teams to ensure compliance with social distancing measures. Weekly results and production plans are now generated via Teams to enable the weekly PPC% to be generated and shared virtually in real-time during the Teams meeting. Team commitments are discussed, made, and captured virtually via shared screens during the meeting. The weekly and updated lookahead plans are issued from Teams shortly after the meeting is concluded. Root causes of failed commitments are also categorised and issued as part of the output of the virtual meeting.

• Digital Pull Planning Meetings – Jacobs has also begun to host virtual pull planning meetings as part of the migration to digital LPS deployment. Previously, pull planning meetings were held in a traditional format with all team members attending in a meeting room using Post-its to identify upcoming milestones and the various tasks required to meet them on time.

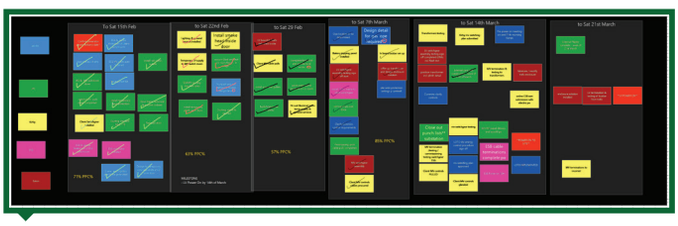

**Figure 1.** Example of Virtual Pull Planning

Jacobs is now employing a number of digital tools to support virtual pull planning meetings, including Nureva and Mural, with good levels of success.

• Lessons from Digital LPS – The changes to the LPS practices outlined above have been successfully implemented in the context of the wider changes on sites and in working practices necessitated by Covid-19. The migration of these LPS practices to remote working has been achieved without significantly affecting performance levels, as reflected by the PPC% trend in Figure 2.

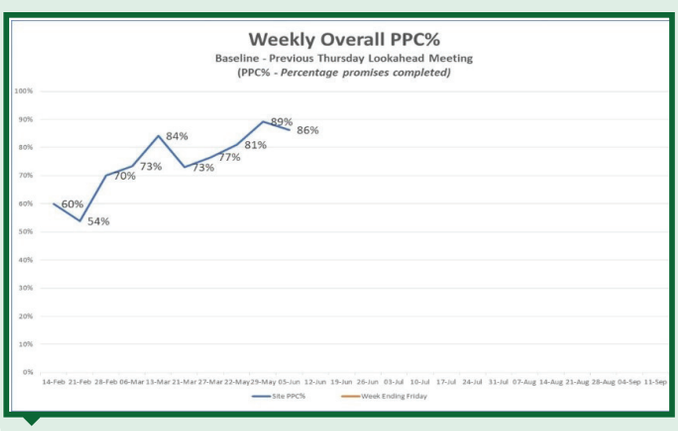


**Figure 2.** PPC Trends

Lean Initiative Improvements and Impact

## Digital and General LPS Benefits

As outlined earlier, the most significant and tangible benefit of LPS deployment is around workflow reliability. The PPC% metric is employed within the context of LPS to reflect the level of workflow reliability. It can be helpful to think of the metric as percentage promises completed rather than just percentage plan complete). The metric does reflect the degree to which the team is making reliable promises.

A significant improvement in the PPC% level – from a baseline of less than 60% to 85% levels – was achieved from the time the team started tracking and focusing on the metric on one of the life sciences projects examined. This PPC% improvement reflects the ability of the whole team to collaborate effectively and to make reliable promises to each other.

As outlined earlier, our experience is that PPC% improvements are brought about by changes in the underlying behaviours that LPS deployment encourages and enables. These subtle behavioural shifts underlie any PPC% improvements realised.

In the case of this project experience, these behavioural changes included:

- More focused and effective collaboration between all stakeholders and contractors, brought about by all parties focusing on a single shared result, namely the PPC% level.
- Clarity – The simplicity and value of the single and memorable result, namely PPC%, that communicates a simple, meaningful result to all stakeholders involved in delivering work should not be underestimated.
- Plan ownership and accuracy – LPS enables all stakeholders to participate in generating short-term plans. This not only creates ownership but also accuracy as plans are based on the most recent information available.
- Behaviours – Specific behaviours the LPS process unlocks include:
    - Encouraging the making of reliable promises in a blame-free environment.
    - Making specific requests of others to enable work to progress.
    - Improvement focus by identifying root causes of failed commitments as opposed to allocating blame.

Additionally, the team began to track the primary root causes underlying failed commitments. The purpose was to focus on the underlying reasons – the "why" as opposed to the "who". Using this information to avoid making the same mistakes twice also contributed to the improvement.

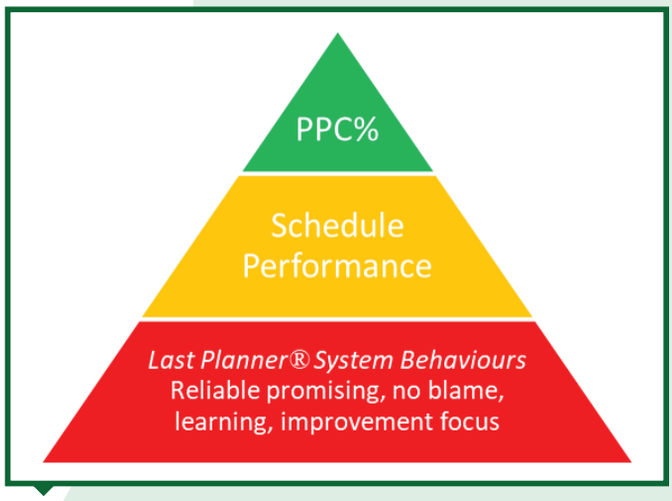


**Figure 3.** Last Planner® System Behaviours and Results

The key conclusions are:

- LPS has yielded significant benefits in the Jacobs life sciences projects on which it has been deployed to date.
- Where teams cannot meet and engage face-to-face due to Covid-19 restrictions, it is possible to adapt some of the elements of LPS deployment to remote working by using a variety of digital tools.
- To date, the migration of elements of LPS to digital tools and remote working has not resulted in any noticeable dilution of the associated benefits.
- The fact that the deployment of LPS was reasonably well-advanced prior to the onset of Covid-19 and the implementation of the associated restrictions has helped the successful migration towards digital tools and ways of working.
- Covid-19 has accelerated the deployment of some digital tools that support digital working and digital LPS deployment.

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