Case Study Title: Marine Piling Productivity increased by 55% enabled by 4D Synchro Integration & Lean Last Planner System

Company Overview | WILLS BROS. LTD. | willsbros.com

Wills Bros Ltd, established in 1972, is a family-run civil engineering contractor headquartered in Ireland, operating across Ireland, the UK, and mainland Europe. With over 500 employees, the company delivers complex infrastructure projects across sectors including transport, energy, environmental, and commercial development.

Wills Bros Ltd maintains a strong in-house capability with a large fleet of plant and equipment and a skilled management team. The company is committed to innovation and continuous improvement, with Lean Construction principles increasingly embedded in its project delivery approach.

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Overview & Background to the Lean Initiative

The Berth 52 & 53 Project at Dublin Port presented a unique opportunity for Wills Bros Ltd to implement Lean Construction techniques on a high-value, complex marine infrastructure project. The project involved significant logistical challenges, including coordination of marine and land-based activities, working over water, and managing multiple stakeholders. Recognising the potential for inefficiencies and delays, Wills Bros Ltd adopted Lean principles to enhance planning, collaboration, and execution.

A dedicated Planner and BIM Modeler were assigned full-time to the project, utilising Oracle Primavera P6 and Bentley Synchro 4D to integrate scheduling and visualisation. These tools enabled real-time updates and seamless data exchange, supporting proactive decision-making and continuous improvement.

To foster team alignment and eliminate waste, weekly Planning Collaboration Meetings and daily White Board Meetings were introduced. These meetings were held in a purpose-built room - the 'Collaborative Planning Room' - which was equipped with a 12-week lookahead board and video conferencing tools, promoting transparency and accountability. The Lean initiative aimed to improve workflow reliability, reduce rework, and enhance stakeholder engagement—ultimately driving better project outcomes and customer satisfaction.

Lean Initiative Undertaken – Lean Thinking, Tools, Techniques

The Lean initiative on Berth 52 & 53 was structured around five core practices of Last Planner System:

1) Milestone Planning,
2) Phase Planning 12 weeks,
3) Make Ready Planning,
4) Weekly Work Planning,
5) Learning & Action
6) and an extra process, Synchro 4D Planning.

Each practice was designed to eliminate waste, improve productivity, and enhance team collaboration.

Planning Collaboration Meeting – 12 Week Lookahead

Held every Thursday, this meeting brought together all section managers and construction team members. The session began with a review of the 3 'C's Register—Concerns, Causes, and Countermeasures. This Lean tool helped identify potential blockers early, categorized by urgency (Critical, Urgent, Noncritical), and assign ownership and resolution timelines. This proactive approach reduced delays and improved workflow reliability.

The team then reviewed the previous week's performance, analysing deviations from planned activities. Uncompleted tasks were rescheduled, and their impact on downstream activities assessed. If delays affected other sections, cross-functional discussions were held to identify mitigation strategies. This collaborative problem-solving fostered a culture of accountability and continuous improvement.

Each section manager updated their area on the 12-week lookahead board, focusing on sequencing, resource needs, and interdependencies. The Planner and Project Manager reviewed progress against - contract milestones, introducing self-imposed milestones to maintain momentum. If slippage occurred, recovery strategies were discussed and implemented. During the 12 week lookahead meeting the 4D Model video is shown to the construction management team to enhance their understanding of the overall Construction sequence.

3C's Register — **MP2 Berth 52 & 53**

Raised	142
Closed	133
Open	10

Non Critical	Urgent	Critical
17	[illegible]	[illegible]
8	[illegible]	[illegible]

Item	Pro W	Programme Rev	Activities ID	Activity	Locat	Description of 3C's	Mitigation	Issue Type	Date Op	Date Close	Action Status	Owner	Schedule Baseline D	Propose Date	Activity Sta
96	VK33	Clause 32 Rev 6	-	-	Dolphin	Platform for Raker pile extension	In the final modifications	Contractor Submission	19-Dec-24		Open	MA		4-Jun-25	Red/Critical
128	VK14	Clause 32 Rev 7A			Dolphins	Propeller wash screen gate alterations	To be delivered on 28/05/25 and added to JUB Date	Technical Issue	06-Mar-25		Open	MA		28-May-25	Red/Critical
125	VK47	Clause 32 Rev 7A			Dolphins	Fluid Mud	Report Awaiting	Technical Issue	27/03/2025		Open	JSw		23-May-25	Red/Critical
127	VK47	Clause 32 Rev 7A			Dolphins	Bracing for Dolphin piles	Linkspan Dolphin will be finalised by 28/05/25	Technical Issue	27/03/2025		Open	GF		6-Jun-25	Amber/Urgent
134	VK31	Clause 32 Rev 8			Jetty	Supply Barge 3	TOV plan	Procurement	24/04/2025		Open	TOS		6-Jun-25	Amber/Urgent
136	VK53	Clause 32 Rev 8			Dolphins	Capstan Mar has been submitted	Awaiting Approval by DPC	Technical Issue	08/05/2025		Open	DS		29-May-25	Amber/Urgent
139	VK53	Clause 32 Rev 8			Jetty	Vide Slab cracks	Response to Richard's email	Production	08/05/2025		Open	GF		23-May-25	Red/Critical
140	VK50	Clause 32 Rev 8			Other	ABR Planning	RAMS and Programme to be submitted	Production	08/05/2025		Open	DK		23-May-25	Amber/Urgent
142	VK50	Clause 32 Rev 9			Dolphins	Fender Shear Chains	Redesign	Technical Issue	22-May		Open	DK		6-Jun-25	Amber/Urgent
143					Jetty	Pile Shoes	Find Fabricator	Procurement	22-May		Open	MA		23-May-25	Red/Critical

Figure 1: 3 'C's Register

Figure 2: Planning Collaboration Meeting – 12-Week Lookahead

Daily White Board Meeting

The 12-week lookahead feeds into the weekly workplan which is published on a white board - see photo figure 3. Every morning from 8:00–8:30am, the site team convened for a focused planning session. Led by the Deputy Project Manager, this meeting translated the 12-week lookahead into actionable daily tasks. Tasks included measurable output (e.g., concrete pours) and enabling activities (e.g., formwork setup). Health & Safety and Quality inspections were also integrated into the daily agenda and recorded on the work plan.

Figure 3: Daily White Board Meeting

Critical tasks were highlighted and discussed with the Client's representative, ensuring alignment and transparency. The meeting detailed required resources—plant, labour, equipment—and clarified responsibilities. At week's end, the Planner analyzed task completion rates, generating two KPIs:

- % of all tasks completed
- % of critical tasks completed

Targets were set at 90% for all tasks and 85% for critical tasks. These metrics were shared via email with supporting visuals, reinforcing accountability and enabling continuous improvement.

Synchro 4D Planning – Coordination & Clash Detection

Bentley Synchro 4D was pivotal in integrating the project's 3D model with the Primavera P6 schedule. This allowed real-time visualization of work sequences, enabling the team to simulate construction scenarios and detect clashes before execution. Weekly animations were shared with site agents and displayed on screens across the site, enhancing understanding and engagement.

Section Managers could consult the 4D Coordinator to simulate alternative sequences or resolve coordination issues. Synchro's ability to compare programme versions side-by-side eliminated speculative planning and supported informed decision-making.

Clash detection was particularly valuable in managing marine plant operations. For example, Synchro identified overlapping barge assignments, allowing planners to adjust schedules and avoid on-site conflicts. This predictive capability reduced risk and improved resource utilization.

Overall, Synchro 4D enhanced project visibility, streamlined updates, and supported Lean goals of waste elimination and value delivery. It also improved communication with the Client, who received programme submissions accompanied by visual simulations, increasing confidence and clarity.

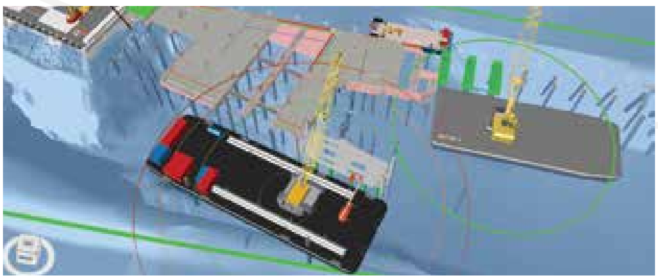

Figure 4: 4D Modelling Allowing Visualization and Clash Detection of Working Plant

Figure 5: Marine Plant Working in Close Proximity

Lean Initiative Improvements & Impact

The Lean initiative delivered measurable improvements across planning, coordination, and execution. Key impacts included:

Improved Programme Understanding: The construction team gained a clearer view of the overall schedule and critical milestones, enabling better alignment and prioritisation.

Enhanced Clash Detection: Synchro 4D allowed early identification of marine plant conflicts, reducing downtime and improving sequencing.

Proactive Pre-Planning: Weekly updates to the 3 'C's Register ensured timely preparation of Temporary Works Designs, RAMS, and permits, preventing delays in physical works.

Cross-Section Coordination: The 12-week lookahead highlighted interdependencies between land and marine sections, fostering collaboration and reducing bottlenecks.

Performance Monitoring: KPI tracking of task completion rates provided actionable insights, driving continuous improvement and accountability.

Strategic Planning Extension: Recognizing a tendency to focus on week's 1–6, Wills Bros introduced bi-monthly strategic planning sessions with a Lean consultant. These sessions required teams to detail their 12-week construction sequence, encouraging long-term thinking and identifying potential risks.

This structured approach to Lean planning improved team cohesion, reduced rework, and enhanced stakeholder confidence. The integration of visual tools and collaborative forums created a transparent and responsive project environment, aligned with Lean principles of flow, value, and continuous improvement.

Marine Piling Performance Improvement

As a result of the lean techniques adopted above, Wills were able to increase productivity of the marine Piling from Season 1 (June 2024 to February 2025) to Season 2 (June 2025 to February 2026) from an average of 2.5 piles installed per week to 3.86 piles/week, an increase in productivity of 55%. This was also enhanced by looking into the micro-management of the piling process with the Foreman and site operatives to see how the process could be streamlined. A mini program for the different types of piling gate set ups was produced and was used to update the Construction Programme and hence improve the robustness of the Construction programme.

Figure 6: Dolphin Piling works with Jack Up Barge

Figure 7: Precast Installation after Piling

Summary and Lessons Learned

The Berth 52 & 53 Project demonstrated the transformative impact of Lean techniques on complex infrastructure delivery. By embedding Lean thinking into planning and execution, Wills Bros Ltd achieved smoother workflows, reduced waste, and improved team performance.

The 3 'C's Register fostered proactive problem-solving and accountability. Daily White Board Meetings ensured clear communication and measurable goals, while the 12-week Planning & Collaboration Meetings promoted strategic alignment and cross-functional coordination.

Synchro 4D enhanced project visibility and enabled early clash detection, particularly in managing marine operations. The integration of visual planning tools improved stakeholder engagement and reduced speculative planning.

Lessons learned include the importance of long-term thinking, the value of visualization in complex environments, and the need for continuous feedback loops. The initiative reinforced that Lean is not just a set of tools, but a mindset of collaboration, transparency, and improvement.

Figure 8: Visualisation Render of the Finished Project