## Company Overview | Collen Construction | collen.com

**collen 200**
building excellence since 1810

Established in 1810, and trading as "Collen Bros." until 1984, Collen Construction is one of the leading construction firms in Ireland, and we are extremely proud of our history and reputation for building quality and excellence. The company offers a full range of construction services, including management contracting, design and build, joint venture/partnering, and turnkey contracts. We have experience in a variety of project types, including residential, commercial, educational, retail, data centres, leisure, health, pharmaceutical, industrial, and conservation, and ranging in value from under €1Million to in excess of €300Million. We have longstanding relationships with numerous Clients and Consultants built up over the years, ensuring the company has remained at the forefront of Irish construction for two centuries. Our Client list is testament to the excellent service the company provides on every project.

### Author

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## Overview & Background to the Lean Initiative

The culture of continuous improvement within our day-to-day operations at Collen Construction means that our organisation continuously strives to exceed our clients' expectations through the adoption of new and innovative Lean practices. The successful delivery of large and complex builds depends largely on the rigorous and systematic approach to scheduling – a tactic that Collen embraces from project initiation stage right through to project handover. This culture empowers our project delivery teams to challenge the status quo and make the best plans even better.

The first area of focus for planning improvements centres on the implementation of a RAID (Risks, Assumptions, Issues, Dependencies) log at our weekly LLP (Lean Last Planner) sessions. The volume of critical information being shared by all project stakeholders at these planning workshops was proving to be very beneficial, but we needed a platform to capture and analyse these constraints to drive confidence with our decision-making. Additionally, the decision to enhance our Project Controls procedures through the adoption of the PDCA model further strengthened our ability to deliver these complex projects on time every time.

## Lean Initiative Undertaken – Lean Thinking, Tools, Techniques

Over the last number of years, Collen has been implementing the LLP tool on a high percentage of our fast-track projects with great success. Our commitment to the Kaizen philosophy means that we are constantly in pursuit of operational excellence, striving to find possible areas of improvement to further enhance our embedded Lean Construction tools.

One area that we decided to focus on over the last 12 months was to further enhance our Last Planner® System (LPS). Typically, we would hold a full day LLP session with all project stakeholders at the start of a project to build-out the master schedule through open collaboration in an environment of trust and support. At these events, the exchange of crucial information between the project stakeholders was proving to be a valuable source of information and the open engagement fostered a platform for discussions on project specific risks, assumptions, issues, and dependencies.

As useful as these sessions were for validating and enhancing the project schedule, we identified through a plus-delta exercise that the opportunity to capture other key project nuances was being missed. It is only after the completion of a typical LLP session that the project team 'deep dive' the information gathered and sieve through the swarm of challenges that each stakeholder presented on the day. The ensuing question related to how all of that information was going to be managed. We needed to incorporate a method of capturing and tracking these project constraint items along with the strategies and action plans to fix them. Instinctively, we decided to implement the RAID log as a parallel tool for the project manager to track the following: Risks, Assumptions, Issues, Dependencies. Identifying these early in the project was going to help us to assess all of these RAID components and act accordingly. Avoiding them could

could cost us or even derail our projects completely.

The opportunity to implement our RAID methodology evolved when we held our first day-long LLP session for a new €50M commercial project in South Dublin that we had recently been appointed as Main Contractor. This complex build was at its initiation stage, providing the perfect time for this Lean implementation. This holistic approach to project planning together with the project stakeholders was held off-site in a conference room in a nearby hotel, providing a comfortable and distraction-free environment for problem solving and open collaboration. The partnership approach with our supply chain enabled a seamless introduction of the RAID log and empowered all teams to contribute to the continuous improvement of our LPS.

The objective of this RAID was to essentially capture all Risks, Assumptions, Issues, and Dependencies that arose during the LLP session, with specific emphasis at the interface zone of the various subcontractor packages. As the various discussions on task sequencing and execution plans played-out, the resultant RAID components were recorded on a shared Master Log (Figure 1) and categorised as follows:

- **Risks** – Any discussion item that had a level of uncertainty, which if materialised, could have impacted the project deliverables or outcomes negatively.
- **Assumptions** – Factors that were assumed to be true were categorised here. These included items whereby subcontractors based their planning on previous experience and historical situations. However, it was vital that the critical assumptions were captured for if they turned out to be invalid, they could have a detrimental impact on the project outcome.
- **Issues** – Items that needed to be resolved and an agreed strategy to get there as soon as possible. We needed to track and monitor these items to mitigate against any roadblocks and/or delays in the workflows.
- **Dependencies** – These were the tasks that were dependent on the completion of other tasks (make-ready) by other trades, ensuring a smoother workflow at the coal-face for task execution.

Our project team's experience and expertise enabled us to identify the correct category for each RAID component, prompting the next step of evaluating their criticality, actions to reduce their likelihood/impact, and assignment of responsibility along with due dates.

| No. | Description | Type | Criticality | Next Actions | Owner |
|---|---|---|---|---|---|
| 1 | | Risk | Medium | Alucraft to follow up on lead in time | ALUCRAFT |
| 2 | | Risk | Medium | Design to be followed up on. | COLLEN/DESIGN TEAM |
| 3 | | Risk | Medium | Collen team to follow up with supply chain | COLLEN PROJECT TEAM |
| 4 | | Risk | Critical | CCL/GDC to look at this detail closely and formulate a QAQC procedure on this particular element | COLLEN/GDC |
| 5 | | Risk | High | Further schedule needed at level 2/level 3 planning stage | ALUCRAFT/COLLEN |
| 6 | | Risk | High | Alucraft to confirm lead in time/order | ALUCRAFT |
| 7 | | Risk | Critical | Needs further analysis at level 2/level 3 planning stages | ALUCRAFT/COLLEN |
| 8 | | Risk | High | DMG/Metec to confirm | DMG/METEC |
| 9 | | Risk | High | Resource requirements to be closely monitored at level 2/3 planning | ALUCRAFT |
| 10 | | Risk | High | Resource requirements to be closely monitored at level 2/3 planning | ALUCRAFT |
| 11 | | Risk | High | Alucraft to follow up | ALUCRAFT |
| 12 | | Risk | High | Design to be tracked | ALUCRAFT |
| 13 | | Risk | Medium | | COLLEN |
| 14 | | Risk | Critical | Critical path activities to be closely monitored here | COLLEN |
| | | Assumption | Medium | Exact point of partial install to be confirmed | COLLEN |
| 15 | | Assumption | Medium | | GDC |
| 16 | | Assumption | Medium | GDC to confirm | GDC |
| 17 | | Assumption | Medium | GDC to confirm | GDC |
| 18 | | Assumption | Medium | Detail to be finalized between GDC/CROWN/DMG | COLLEN |
| 19 | | Assumption | Medium | CCL to review | CCL |
| 20 | | Assumption | Medium | DMG to confirm | DMG |
| 21 | | Assumption | Medium | OTIS to confirm | OTIS |
| 22 | | Assumption | Medium | To be further reviewed at level 2/3 planning | CCL |
| 23 | | Assumption | Medium | N/A | CCL |
| 24 | | Assumption | Medium | N/A | |
| 25 | | Assumption | Medium | CCL to follow up with plastering contractor | CCL |
| 26 | | Issue | Medium | RFI with METEC | METEC |
| 27 | | Issue | Medium | RFI with METEC | METEC |
| 28 | | Issue | Medium | To be coordinated at level 2/3 planning | ALUCRAFT/CROWN |
| | | Dependency | Medium | Liaise with IDA | CCL |
| 29 | | Dependency | High | GDC/CROWN/ALUCRAFT to coordinate and confirm detail/sequence of install | CCL |
| 30 | | Dependency | Medium | Monitor completion date of CW scope to flag completion of mast climbers | CCL/ALUCRAFT |
| 31 | | Dependency | Medium | Appoint package to steel contractor | CCL |
| 32 | | Dependency | Medium | Crane booking tracker needed | CCL |
| 33 | | Dependency | High | Stonetech to confirm, resources to be monitored | CCL/STONETECH |

**Figure 1.** Master Project RAID Log

## Project Controls

In recent years, Collen has successfully carried out a significant number of fast-track, multi-million euro projects across Ireland and Europe. The schedules associated with these complex builds have become more and more demanding, highlighting the need for further enhancements to an already robust project controls mechanism within the organisation. With a strong continuous improvement culture embedded, Collen looked towards the PDCA (Plan-Do-Check-Act) cycle (Figure 2.) to augment our schedule management procedure with the aim of mitigating against schedule slippage and to de-risk all projects from costly delays. Using the PDCA model, we incorporated a step-by-step process at project management level, providing a platform as a single source of truth for Schedule monitoring. This tracking tool incorporates:

- **Plan** – Enhancements made through identifying the key project milestones and detailed six-week look-aheads incorporating a mechanism for forecasting the start and finish dates for critical activities.
- **Do** – Follow through on the critical requests for further information (RFI), submittals, package procurement, and execution of construction tasks.

- **Check** – Introduced robust monitoring of all the project KPIs including APC (Actual Percent Complete) Vs PPC (Planned Percent Complete) for all site activities, SPI (Schedule Performance Index) trends, Subcontractor performance, Schedule variance analysis, and Schedule risk analysis.
- **Act** – Prompts focus on mitigation measures and corresponding action plans for under-performing tasks.
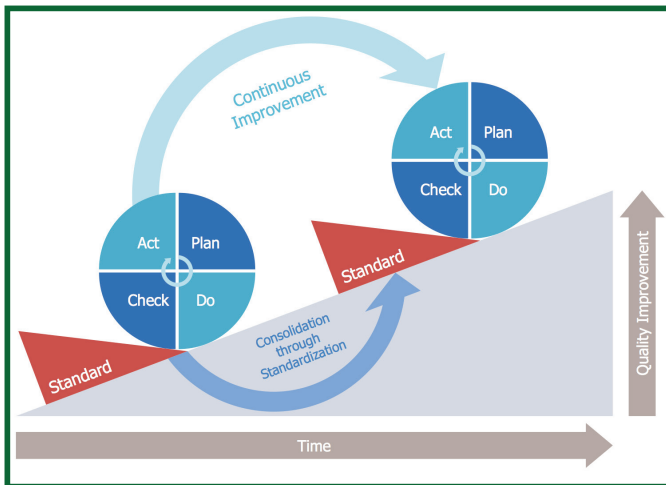


**Figure 2.** PDCA Cycle

One of the key components of this PDCA cycle is the Check step wherein a quantitative risk analysis is carried out on those items that present themselves as potential impacts to the project baseline. The evaluation of both the likelihood and impact of such an event acts as an early warning system and also gives our project managers greater confidence in their decisions on what mitigation action is required. This weekly cycle drives focus on the schedule and provides the prompts for our project managers to keep their fingers on the pulse regarding project performance. Fundamentally, the steady improvement in the quality of project planning increases as the project grows through each phase.

## Lean Initiative Improvements & Impact

### RAID implementation

The benefits that RAID analysis brought to our master planning were immediate and brought more certainty to the schedule through the assignment of action plans to the various stakeholders. The incorporation of the RAID log to the weekly pull planning sessions on our South Dublin project was therefore a natural step forward on our Lean journey. During these weekly pull planning sessions (Figure 3), the project manager is now mandated to update the log and track all risks, assumptions, issues, and dependencies in a transparent manner as the various subcontractors step through their look-ahead tasks for the following period.

This collaborative approach to planning also lends itself to increased workflow efficiency at the package interfaces and promotes a safer working environment for our subcontractors through the clear understanding of 'make ready needs'.

The coordinated and timely management of the project constraints makes it a lot easier for our project management team to identify potential bottlenecks well in advance, triggering the need to devise an appropriate path to risk mitigation. On this particular project, this weekly engagement of RAID analysis resulted in a 2-week improvement on a 16-week target duration for the completion of the RC structure. By focusing on the RAID components, the project team was able to move roadblocks in a timely manner, and ultimately drive efficiencies within the formwork workflows, increase productivity and improve this critical path activity by 12%. The efficiency of our procurement has also vastly improved thanks to the early and appropriate categorisation of project constraints during these sessions.

The integration of the RAID log provides the platform to focus on long lead items – revisiting these inputs every week prompts the project team and subcontractors to address typical issue such as open RFIs/submittals that could potentially delay material orders for example. Long lead elements relating to the curtain walling package on this project were able to be procured on time as a result of this weekly focus on constraint removal through RAID. Moreover, the logging of constraints has led to increased morale throughout the supply chain as all LLP participants now know that their voices will be heard and concerns recorded through the RAID log.



**Figure 3.** Weekly Last Planner Session

### Project Controls-PDCA cycle

The recent enhancements that we have made to our Project Controls tools have now been introduced across all Collen projects, both in Ireland and Europe. The cyclic nature of our embedded PDCA model promotes a ubiquitous approach to project planning, providing the tools for our project managers to de-risk areas of concern associated with the project schedule. Not only does this form of risk management provide a roadmap for improved schedule adherence, it establishes transparent and real-time data on on project performance for all stakeholders.

By adopting a standardised approach, we can ensure that the project KPIs are communicated in a consistent and concise manner. This enhanced form of schedule planning has also vastly improved the execution of project planning at project management level, with a notable improvement on project SPI values along with minimal variance to the key project milestones across a number of projects. In fact, we have witnessed an improvement on schedule performance across 80% of our projects over the last 6-month period, with the critical milestones coming in on or ahead of schedule. Our project managers' ability to manage schedule risk has been bolstered with the addition of this new technique to their toolkit for successful project management.