

THE MAGAZINE OF THE CONCRETE SOCIETY

# CONCRETE

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# THE IMPORTANCE OF PRODUCTION PLANNING AND MONITORING IN CONSTRUCTION

With the world rapidly advancing towards automation, it is imperative for the construction industry to leverage advanced technology to enhance monitoring and tracking capabilities. Integrating real-time production planning and tracking in construction projects allows companies to manage the dynamic environments of construction sites effectively. **Shanthi Rajan** of **Linarc** reports.

**W**hether dealing with concrete work, carpentry or interiors, meticulous planning and real-time monitoring are crucial for large-scale commercial projects. Reliable production control is essential for ensuring efficient, timely and budget-compliant project completion, regardless of the management approach. Innovative solutions and cutting-edge technology are needed to streamline production management and provide accurate production estimates.

## UNDERSTANDING PRODUCTION PLANNING RESPONSIBILITIES

Traditional construction production planning organises tasks around resources and project goals, often using a work breakdown structure (WBS) for cost estimation and scheduling. This method lacks input from trade contractors and vendors, leading to reactive management and delays, focusing on high-level details rather than ensuring safe and efficient task execution.

Conversely, contemporary construction planning integrates concurrent product and process design, incorporating detailed task specifications and constraints to enhance reliability. The last planner system (LPS) exemplifies this approach by identifying task-

level workflow issues and enabling decentralised decision-making, thereby improving overall project performance. Effective production planning organises tasks, resources and quantities for efficient project execution within timelines. Aligning daily trade-specific production with the overall schedule ensures precise resource allocation, effective co-ordination, continuous progress monitoring and schedule realignment.

## AIRPORT TERMINAL PROJECT

A case study showcases an airport terminal client using Linarc's tools to overcome challenges, achieving superior outcomes through enhanced planning, co-ordination and real-time adjustments, illustrating the transformative impact of comprehensive production planning in construction management.

A major contractor encountered significant challenges in planning, managing and monitoring the production of a new airport terminal project. These challenges included accurately planning, scheduling, setting weekly production quantities, co-ordinating multiple trades and ensuring timely progress tracking.

The project is the construction of a new terminal and the extension of an existing terminal at a major international airport. The project's

scale was 102,000m<sup>2</sup> of terminal space and 66,000m<sup>2</sup> of apron over five years.

## PROBLEMS FACED

The size and scale of the project inherently had significant challenges in planning and co-ordination. The contract terms stipulated timely completion. Lack of co-ordination and consensus with critical trades threatened the project schedule. Identifying the resources required and verifying weekly production quantities were nearly impossible. Key issues included:

- Resource allocation:
  - ◇ Labour – ensuring timely availability of skilled operatives.
  - ◇ Equipment – managing procurement and allocation of essential machinery.
  - ◇ Materials – co-ordinating material supply to avoid delays.
- Integration and communication:
  - ◇ Stakeholder alignment – keeping all stakeholders, including subcontractors, in sync with production goals.
  - ◇ Project phases – integrating various phases smoothly to prevent miscommunication.
- Risk management:
  - ◇ Demand fluctuations – handling unpredictability in resource demand.
  - ◇ Material delivery – keeping track of materials required and availability on-site.

- ◊ Productivity losses – mitigating risks of delays and reduced productivity.
- Strategic planning:
  - ◊ Optimisation – using resources efficiently and minimising conflicts.
  - ◊ Productivity – maintaining high productivity levels to meet project milestones.

## MAIN OBJECTIVES

The construction manager aimed to optimise weekly production quantities, resource planning and productivity. The key objectives included: calculating weekly production by trade and zone; efficiently allocating labour, equipment and materials to minimise waste; enhancing

stakeholder co-ordination; and developing a flexible construction schedule.

Additionally, the construction manager sought to: identify and resolve resource conflicts early; enforce stringent quality control; mitigate risks related to supply chain and labour disruptions; maintain a safe working environment; and leverage technology and data analytics for informed decision-making. Continuously realigning production quantities and trade schedules was essential to keep the goals realistic.

## THE SOLUTION

By integrating Linarc's scheduling, planning and monitoring tools, the client achieved superior project outcomes. The platform provided critical insights that streamlined operations and enhanced overall efficiency:

- Break down the project by location and set delivery dates – with Linarc's mark-up and mapping tool, the project was divided into zones and levels for efficient management and monitoring. This enabled breaking down the work

or activities by trade for each zone and set dates.

- Build a comprehensive schedule – the planner and scheduler allowed the client to create detailed WBS and activity schedules, organising planned quantities by zones and trade. The ability to adapt the sequence based on the project execution methodology, lean and critical path method (CPM) methodology helped maintain a consistent core process. Once the schedule is set with planned start and end dates, quantity units, work hours and dependencies, Linarc can identify the critical path and adjust dates to ensure alignment with the delivery timeline.
- Schedule with quantities – integrated with the schedule, the production planner generated comprehensive weekly tables outlining planned production. These weekly production quantities could be customised based on task type, difficulty, ideal production curve and concurrent tasks. The





platform's flexibility in adjusting weekly production, considering factors such as material and operative availability and task interdependencies, provided construction managers with precise and adaptable production planning capabilities.

- Weekly production quantities – the client was able to request weekly quantity updates from trade project managers. With alerts and notifications from Linarc, the entire project team stayed on top of quantity updates. This allowed the construction manager to review planned vs actuals and make revisions for the upcoming weeks. Integrated collaboration and role-based permissions helped connect the team and secure access to relevant information in real time.
- Cumulative weekly production and actuals – the platform facilitated tracking cumulative weekly production, comparing planned progress against actuals. This transparency helped identify bottlenecks and make timely interventions.
- Weekly operative distribution – the planner provided insights into the planned weekly operative distribution for the required quantities, ensuring that the right number of operatives was allocated to each task at the right time.
- Cumulative weekly production and operative count – by

comparing cumulative planned production with actual operative counts, the client could optimise labour and maintain schedule alignment, improving efficiency and reducing delays.

## KEY OUTCOMES

The airport terminal project overcame its previous challenges using production planning and monitoring tools. The client achieved:

- enhanced accuracy in production planning and execution
- improved co-ordination among different trades
- real-time visibility into project progress and resource usage
- reduced delays and risks through proactive adjustments based on real-time data.

This case study shows how the platform can transform construction project management, driving efficiency and ensuring successful project completion. By focusing on meticulous production planning and continuous monitoring, construction projects can achieve higher efficiency, timely completion and budget adherence, ultimately leading to successful project outcomes. 

## OPPOSITE PAGE, BOTTOM:

Location mapping by area/zones to plan production.

## OPPOSITE PAGE, INSET:

Schedule with quantities.

## BOTTOM:

Building a comprehensive schedule.

## INSET BELOW:

Cumulative weekly production and crew count.

