



# GN GUIDELINES

NO.244

ANOTHER MITEK ADVANTAGE – NOVEMBER 2017



By Andrew Scane – Product Manager SAPPHIRE™ Implementation

## Constraint modelling for consistent results

The practice of managing truss plants to maintain constant production flow at the pressing stations has been a successful approach for many years. This approach considers the pressing stations as the “managed bottleneck,” and the goal is to ensure that the bottleneck does not move to any upstream or downstream processes. This approach, also known as constraint management, is well recognised and can be formalised by creating a model, resulting in a helpful monitoring tool for plant managers.

The building of a constraint model involves identifying all the key processes in the workflow that could potentially become the bottleneck and impact the flow at the pressing stations. The bottleneck could move for many reasons, including equipment breakdowns, absenteeism, drop-offs in quotes or sales levels, and so on.

As an example, let’s create a constraint model for a truss plant that aims to produce 350 units through the pressing stations per day. We’ll include the upstream office constraints as the number of quotes received, the estimating requirement (to achieve the strike rate), the number of orders received and the detailing requirement. In the production area we’ll include the amount of cut components required.

When these constraints are identified, their requirements can be determined to meet the 350 unit requirement at the pressing stations. Understandably, there need to be some averages used in the calculations of some of the constraint requirements to relate to the 350 units at the pressing stations. The table at the top right shows an example of upstream constraint requirements and the basis of their calculation.

Now that the constraint requirements per day are balanced for the pressing requirement, the next step is to identify any likely occurrences that may impact the requirements. For example, this could be a seasonal drop in the daily level of quotes

Constraint model		
Upstream constraints	Requirement/day	Calculation basis
Quotes in	12 quote requests	Average 125 units/quote
Estimating	1520 units	23% strike rate
Orders in	\$21,000	Approx. sell \$60/unit
Detailing	350 units	
Cutting	1400 pieces	Approx. 4 pieces per unit
Pressing	350 units	

received, which may impact the estimating levels and, in turn, impact the level of orders. Other likely occurrences could be based on staff absenteeism history and equipment reliability records.

When the level of these occurrences is understood and based over a reasonable period of time, their potential impact on requirements can be established. The aim is to avoid the impact, and this can be done by determining a suitable level of redundancy, or “buffers” for each identified constraint.

As an example, let’s determine a buffer size based on absenteeism history and breakdowns at the saw stations. If it’s established over a reasonable period that these occurrences regularly cause the sawing process to be inoperable for up to half a day at a time, then a reasonable buffer requirement could be 700 pieces. Therefore, in addition to the sawing station’s daily requirement of 1400 pieces, a buffer is required to be maintained at a level of 700 pieces.

Suitable buffer levels can be determined

for each constraint and included in the model in the table below. (\*Note that consideration of other business costs including inventory levels is important when determining suitable buffer levels.)

Now that the constraint model including buffer levels is established, it provides a useful monitoring tool that can be modified as required to reflect the requirements of the business and the market.

The constraint management approach (or Theory of Constraints) is well documented and used in manufacturing and processing plants worldwide. Some recommended reading is *The Goal: A Process of Ongoing Improvement*, by Eliyahu M. Goldratt.) The impact of constraint movement on profitability is significant and the prevention is recognised as a key objective for process management.

Investing the time to create a constraint model can help truss plants maintain consistent production flow through the pressing stations and achieve predictable and consistent results. **T**

Constraint model		
Upstream constraints	Requirement/day	Buffer level requirement
Quotes in	12 quote requests	3 days – 36 quote requests
Estimating	1520 units	
Orders in	\$21,000 orders	5 days – \$100,500 orders
Detailing	350 units	3 days – 1050 units
Cutting	1400 pieces*	½ day – 700 pieces
Pressing	350 units	

**Visit [mitek.com.au](http://mitek.com.au) for all guidelines**