



# Expansion Options at The Kelpies Furniture Scotland



## Introduction

This resit of Assignment 2 for MANP001 is based on the initial case study of Kelpies Furniture Scotland (KFS). You must work individually on the development and production of the outputs to address the set tasks. This individual work will be a demonstration of your abilities with Simul8 to explore and assess expansion options for KFS.

## Demand and Plans

Detailed data describing the production of 1021 furniture orders between 2021 and 2022 for Model 1 – 4. The success of expansion at Fife has demonstrated the capability of the business to grow and increase production while maintaining high quality standards of the product and services. The CEO is keen to replicate effective operation at Fife and aims to have only one location for all activities in Stirling by 2025. The expansion option

means all activities and resources at Fife will be moved to Stirling. The CEO often wonders if this expansion will be sufficient for KFS to grow the business.

## Expansion Options & Task

---

Using a working basic Simul8 model and analysis from KFS dataset:

1. Show how the factory could operate at an expected output of 3500 models per year (equally between models) if Model 3 and 4 to discontinue with 2, 4 and 6 staff at each workstation. This expansion is considering 5% production will go to rework. Show how the output can be produced at a rate of the following shift options:
  - a. the current shift - Monday to Friday (7am - 2 pm and 2-9 pm)
  - b. option 1 – Monday to Friday (7am – 3pm; 3pm -11pm and 1pm – 7am)
  - c. option 2 – Monday to Sunday (7am-3pm and 3-9pm)
  - d. option 3 – Monday - Saturday (9am -5pm)
2. Produce the lower and upper figure estimates of related key performance indicators (KPIs) for the options of working with 2 people per activity per shift; 4 people per activity per shift and 6 people per activity per shift.
3. Describe the models you have made, ensuring that you describe all elements used in the model (screenshots details properties of clock properties, start point, activities, resources, shift patterns, results, trails), justify each model produced with trials and verification (summary comparison of results KPIs of different options with reality, base simulation and trials), and refer to outputs you have produced in Simul8.
4. Run the models for 10 weeks with 20 trials, reporting on the number of orders that can be completed, utilisation and any issues you see in production. This means you need to validate the models using the various historical data (refer to KFS dataset).
5. Interpret the results of the simulation made, answer direct questions of management related to expansion, and offer suggestions to management on the viability of this arrangement and any production issues they should prepare for. In particular, if there are any queues that cause significant backlogs, make suggestions to management for dealing overcoming the problems.
6. Use the enhanced models to assess the expansion options. Any assumptions should be clearly highlighted in the technical note.
7. Write an accompanying technical note (Word document: 500 words) containing:
  - Highlights of your simul8 model (key features)

- From the developed models of potential solutions, produce a table of key features of the analysis and what this will mean for the business with reference to the key objectives
- Show evidence of validation of the enhanced model
- Make recommendation(s): interpreting the results of the analyses
- Develop suggestions for further analyses

Technical Notes: Make good use of structured tables and figures to document how you modelled the tasks for this assignment. The 500 word count limit excludes all tables or figures.

8. Provide a copy of your Simul8 model to evidence and corroborate your analyses reported in your technical note.

## Submission and Notes

---

- This assignment is an individual task.
- This assignment accounts for 50% of the module marks.
- Deadline: **12 noon 18<sup>th</sup> March 2024**. Your assignment should be submitted electronically via **canvas**.
- Word limit: 500
- Format: Technical Note
- Please include your Student Registration Number on your cover page. Ensure your report file name is clear, consistent and match with your Simul8 (.S8) file which include your Student Registration Number.  
**Example: 1234567\_assignment2.pdf; 1234567\_assignment2.docx; 1234567\_assignment2.S8**
- All reports go through Turnitin on submission. It is imperative that the work you submit is your own. If there is any proof of copying or plagiarism this is a serious academic matter and you may be called to an academic integrity meeting.
- It is the individual responsibility of each student to ensure that there is a low similarity index score. A high similarity index score must be investigated and rectified by the student prior to final submission of the assignment. Information on how to use Turnitin can be found at: <http://www.plagiarism.stir.ac.uk/moreinfo.php>

### Information based on production director's report.

Other options of the models as presented in Table 1.

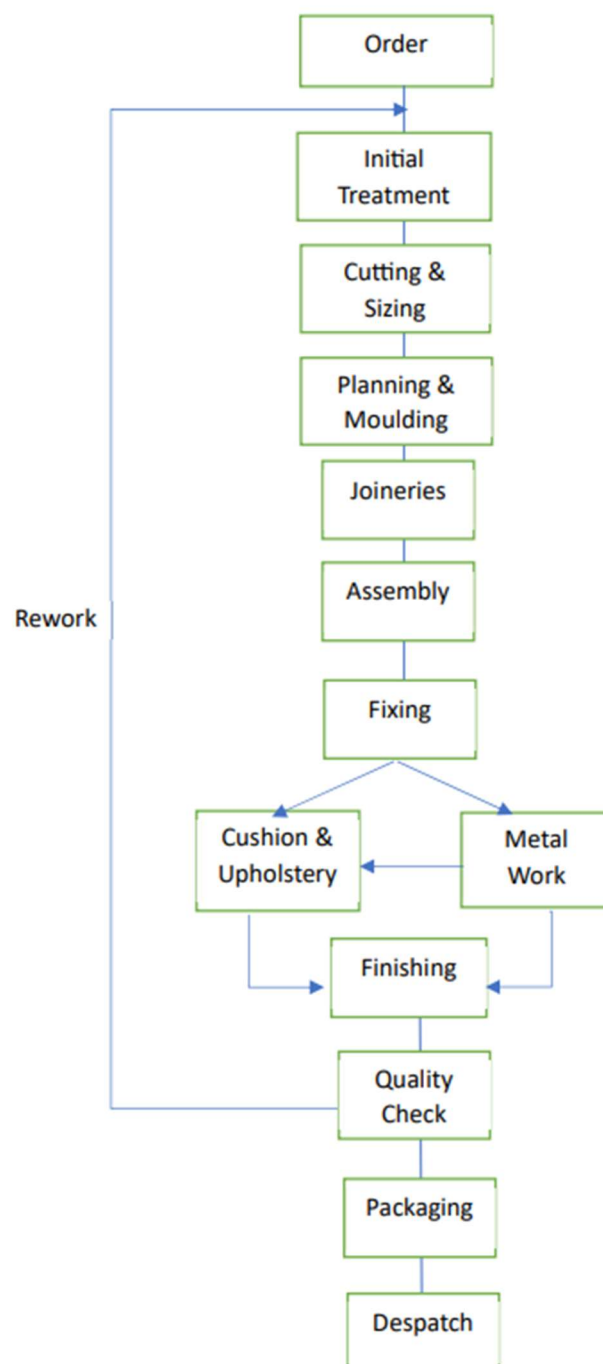
Model	Material - Wood	Material -Metal	Cushion & Upholstery	Metal Work
1	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	-
3	Yes	-	Yes	-
4	-	Yes	-	Yes

Table 1: Available models and specifications

## Production process

Figure 1 illustrated the standard production process for each 4 models. The process begins as soon as possible after an order is received from customer, however there can be delays since orders are placed online and often during company holiday shutdowns. Each item is given a unique order number, linking to details on model type and specification of materials.

**Figure 1: The Process flow of production line**



The three new proposed shifts are shown in Table 2.

	<b>Current</b>	<b>New Shifts Option 1</b>	<b>New Shifts Option 2</b>	<b>New Shifts Option 3</b>
<b>Operating Day</b>	Monday - Friday	Monday - Friday	Monday - Sunday	Monday - Saturday
<b>Operating Time</b>	Morning shift: 7am – 2pm  Afternoon shift: 2pm -9pm	Morning shift: 7am – 3pm  Afternoon shift: 3pm -11pm  Night shifts: 11pm – 7am	Morning shift: 7am – 3pm  Afternoon shift: 3pm -9pm	Day shift: 9am-5pm

Table 2: Current and proposed new work pattern.