

CHAPTER 5 - CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Table 5.1 – Cut Result

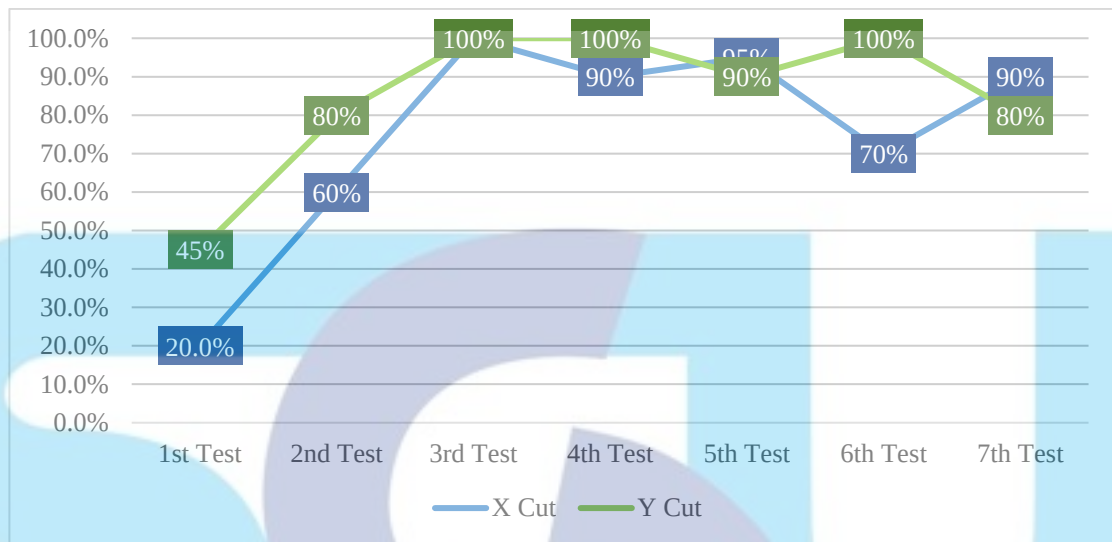
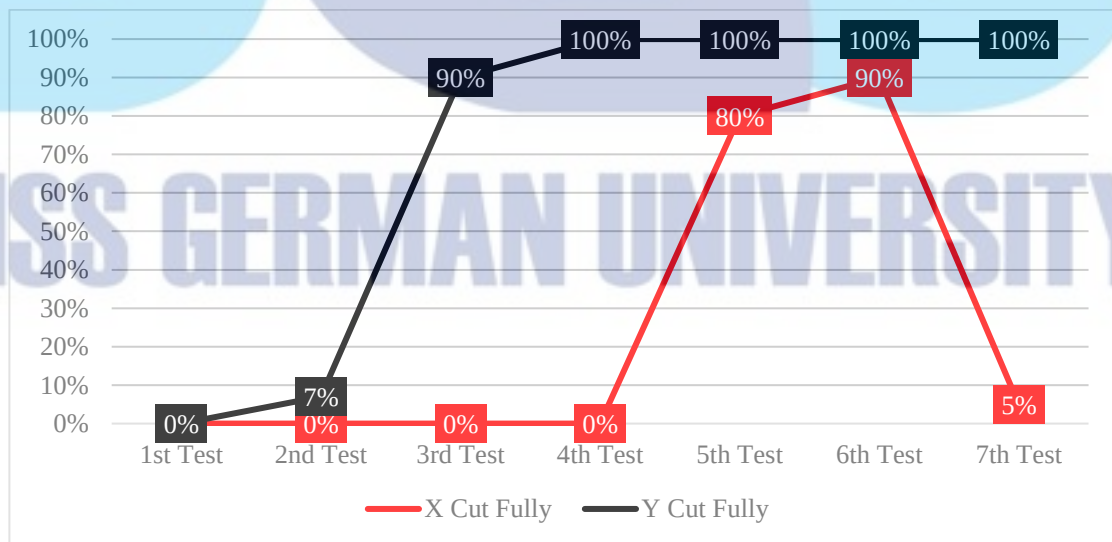


Table 5.2 – Fully Cut Result



After plotting the diagram of the result (Table 5.1 – Cut Result), it can be seen that achieving a complete cut in the X direction is not as easy as Y direction. Cutting in X direction also need a lot of variable adjustment: the friction ratio between the nata with the clamp and the nata with the bed, the cutting speed, knives angle, knives and clamp overlapping height, and so on. In Y cut, not so many adjustments are necessary to achieve complete cuts.

The potential root cause is the method itself. Cutting the nata using stationary blades will have less issue when the nata is stationary and the blades move, rather than the blades sit and the nata moves.

However, given all adjustments in X cut are correct, the complete cut is possible to be undertaken. It is very unfortunate that the nata sample is limited, hence the researcher cannot make a more thorough and detailed research regarding the variable adjustments.

5.2 Recommendations

To achieve a better result with the current design, design refinements need to be done:

1. Replace the dull blades
2. Adjust the angle of cutting blades (might also try the revision from the last testing)
3. Increase blade height vs nata thickness
4. Increase blade overlap with clamping plate slits
5. Modify clamping plate surface for better grip (knurled, slotted, or even vacuum)
6. Repair or replace the clamping piston to prevent leakage (pressure drop)

If the refinements are successful, then upgrade the automation process:

1. Y-cut and transfer plate automation
2. Clamp cylinder replacement with longer stroke
3. Upgrade X-cut actuator using servo linear system / rodless cylinder
4. Ejector system for the finished product
5. Feeding system using conveyor
6. Dull blade detection system
7. Data history log for production supervision and statistics

If the refinements are not successful, then there are three options:

- Use the same design but change the stationary blades into rotary blades
- Explore new concepts with same method: stationary nata & moving blades (X & Y)
- Explore completely new method of cutting: high-frequency wire cutting, waterjet cutting, and so on.