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Miraflex Changeover Time Reduction

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1. Introduction

Flexographic printing is widely used in flexible packaging due to its high-speed capabilities and adaptability to various substrates. The Miraflex CI flexo press, known for its automation and modularity, is often used for short to medium run jobs. However, frequent changeovers due to growing SKU variety increase non-productive time.

1.1 Problem Statement

Despite its automation, Miraflex changeovers take considerable time for plate mounting, ink washing, job data input, and substrate alignment. Reducing changeover time is essential for improving press uptime and throughput.

1.2 Objective

- To analyze existing changeover procedures on Miraflex CI flexo presses.
- To apply Lean tools, especially SMED, for time reduction.
- To measure the impact of improvements on productivity.

2. Literature Review

2.1 Changeover Time in Flexo Printing

Changeover time refers to the duration between the last good print of a previous job and the first good print of the new job. It involves several steps such as:

- Ink draining and refilling
- Plate changes
- Anilox roll cleaning
- Tension and registration settings

2.2 Lean Manufacturing and SMED

Single-Minute Exchange of Dies (SMED), introduced by Shigeo Shingo, targets changeover time reduction by:

- Separating internal and external activities
- Converting internal to external tasks
- Streamlining internal activities

2.3 Relevance to CI Flexo

Flexo presses like Miraflex benefit significantly from SMED because most changeover steps are mechanical and repeatable.

3. Methodology

3.1 Equipment Used

- Press: Miraflex CM 10 (8-colour, sleeve-based)
- Substrate: BOPP and PET
- Jobs: 30 changeovers analyzed over 2 months

3.2 Data Collection

Each changeover was broken into key steps:

1. Unloading previous job components
2. Washing ink units
3. Mounting new sleeves and plates
4. Register and impression settings
5. Color matching and calibration

Video analysis and operator interviews were used for accurate timing.

3.3 Implementation of SMED

- Externalization: Pre-preparation of sleeves, plates, and inks during previous job run
- Tool Kit Optimization: Mobile changeover trolleys, digital job cards
- Parallel Operations: Assigning dual operators for synchronized tasks
- Standardization: Visual SOPs and checklists

4.1 Observations

- Parallel activities had the highest impact on time savings.
- Skill level of the operator played a significant role.
- Digital job recipe upload (via W&H ProControl) saved setup time.

4.2 Challenges

- Operator resistance to process change
- Initial training time
- Need for tool investment (trolleys, sleeve holders)

Results and Discussion

Changeover Task	Before SMED (min)	After SMED (min)	Time Saved (%)
Plate Mounting	22	13	41%
Ink Washing	18	11	39%
Sleeve Change	12	8	33%
Data Entry & Setup	9	6	33%
Register & Impression	15	9	40%
Total	76	47	38% Avg

5. Conclusion

The implementation of SMED and Lean practices on the Miraflex CI flexo press led to significant reduction in changeover time. A 38% average time saving directly translated into increased uptime and better job scheduling flexibility. For high-SKU environments like flexible packaging, changeover efficiency is crucial to competitiveness.

5.1 Future Scope

- Integration of AI-driven job scheduling
- Use of Augmented Reality (AR) for changeover guidance
- Automation of anilox roll cleaning systems

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