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Report on MTM-SAM Predetermined Time Analysis of Window Installation

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Location: Produktionstekniskt Center (PTC), Trollhättan, Sweden
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Purpose: Determine time efficiency of the Click-In system compared to traditional window installation using fixing lugs and wedges.

Introduction

MTM-SAM (Methods Time Management - Sequence-based Activity and Method analysis) is a MTM validated predetermined time system developed in 1982 by the Swedish Efficiency Organisation's Technical Committee with participation from major industrial companies such as VOLVO, ASEA, and SAAB-SCANIA. MTM-SAM allows for a structured, sequential analysis of working methods, enabling fast and precise execution time calculations.

The main objective of the study was to compare the installation time required for the Click-In system versus the traditional fixing lug and wedge method. The analysis was carried out by Jan Oscarsson, a certified SAM-technician, utilizing MTM-SAM methodology.

Methodology

To ensure a fair comparison, the following standardized conditions and assumptions were applied:

- The same wall opening, window type (wooden, triple-glazed with aluminum cladding), and installation position were used.
- Installation tools were positioned 1.5 meters from the wall opening.
- The window and lifting tools were positioned identically for both methods.
- Vertical installation was used for both methods.
- Click-In brackets were pre-mounted on the window frame.
- Fixing lugs were mounted on-site.
- The analysis was conducted under ideal conditions to establish baseline performance.

Results

The analysis identified the sequence of operations and corresponding time requirements for each installation method.

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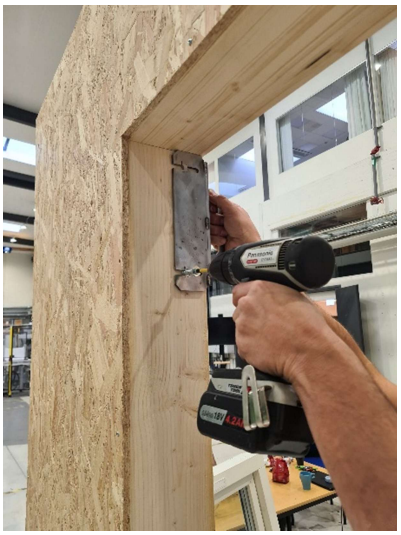
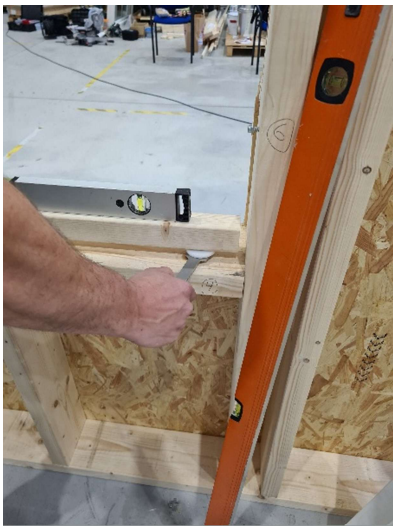
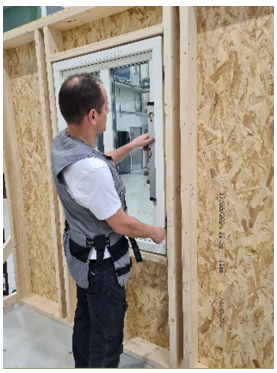
Click-In Installation System

Operation sequence		sec
1	Pre-drill assembly holes	63
2	Click-in screw and washer mounting	74
3	Fastening frame verification	26
4	Window insertion in wall frame and adjustment	81
Operation time		244
*Allowances**		10 %
Net Operation time		268

*Allowances are company specific agreements, assigned to 10% for the study



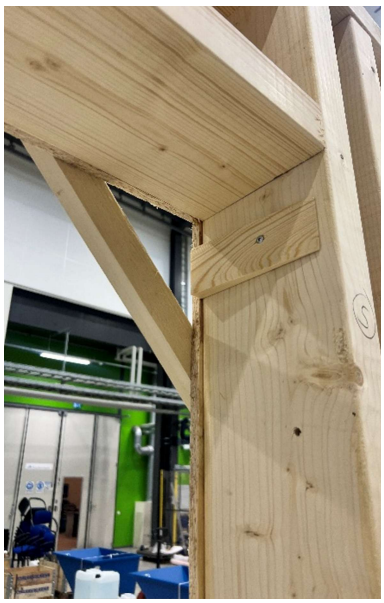



Traditional Fixing Lug Installation

Operation sequence		*sec*
1	Mount fixing lugs on window frame	143
2	Mount safety brackets on the outside	77
3	Washer and wedges (bottom and sides of wall)	83
4	Place and pre-fasten window	57
5	Adjust window	123
6	Lock window with screws and wedges	72
7	Remove safety brackets	66
8	Cut wedges	108
Operation time		727
*Allowances**		10 %
Net Operation time		800

*Allowances are company specific agreements, assigned to 10% for the study



Conclusion

The MTM-SAM analysis demonstrated a significant efficiency advantage of the Click-In system over the traditional fixing lug method:

- **Total time saved: 532 seconds (66.5% reduction).** The Click-In system is nearly three times faster, reducing installation time from over 13 minutes to just 4.5 minutes per window under ideal conditions. This efficiency boost allows more windows to be installed per shift, improving labor productivity and reducing workforce costs.
- **Fewer operational steps:** 4 vs. 8
- **More streamlined workflow:** Pre-mounted brackets eliminate on-site preparation, reducing complexity and installation time. Additionally, fewer steps mean less reliance on specialized tools and equipment, allowing for smoother operations and minimizing potential installation errors.
- **Enhanced ergonomics:** The Click-In system minimizes strenuous tasks such as repetitive screwing and manual wedging, reducing physical strain on installers.
- **Improved consistency and quality:** Fewer manual steps lead to a lower likelihood of human error, ensuring higher precision and repeatability in installations.
- **Cost-effectiveness:** The reduction in installation time translates to lower labor costs and increased efficiency, making it an economically viable solution.

By transitioning from traditional installation methods to the Click-In system, significant time savings and efficiency improvements can be achieved, making it a more effective solution for window installation projects.