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Light Steel Construction Training for the Community of Cawang Urban Village, East Jakarta

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A B S T R A C T

The availability of conventional timber, particularly teak wood, has been steadily declining alongside escalating prices that render it increasingly unaffordable. This condition has compelled communities to seek alternative construction materials, with light steel emerging as a highly favored option due to its lightweight properties, structural flexibility, termite resistance, and ease of application. Nevertheless, the implementation of light steel construction requires a competent and skilled workforce capable of producing high-quality and efficient work outcomes. The program was delivered through a combination of socialization sessions and hands-on practical training, aimed at enhancing participants' understanding of the material properties of light steel, installation standards in accordance with SNI 8399-2017, and independent skills in assembling ceiling and partition frameworks.

INTRODUCTION

Cawang Urban Village is one of the administrative villages located within the jurisdiction of Kramat Jati Sub-district, East Jakarta Administrative City, DKI Jakarta Province. Geographically, the village encompasses a total area of 179.04 hectares and is inhabited by 38,477 residents comprising 13,282 households, organized into 12 Neighborhood Units (Rukun Warga/RW) and 115 Community Units (Rukun Tetangga/RT). The primary occupations of the local population include trading, private sector employment, and civil service.

Timber as a construction material has become increasingly difficult to obtain, particularly teak wood, given its diminishing supply and continuously rising market prices. This condition has prompted communities to seek alternative construction materials, with light steel gaining considerable popularity due to its adaptability across various construction applications, especially for ceiling and partition frameworks. Light steel is a metal alloy that, following an atomic and molecular composition forming process, yields a material that is lightweight, flexible, and termite-resistant. These properties align with the principles of environmentally sustainable construction, as the material is 100% recyclable, maintains high dimensional precision that minimizes construction waste, and eliminates the need for repeated chemical treatments such as anti-termite applications required by conventional timber.

Nonetheless, the implementation of light steel construction still demands competent human resources to ensure productive and high-quality workmanship. In Cawang Urban Village, the key challenges identified include: (1) limited community knowledge regarding the characteristics and profiles of light steel in accordance with SNI 8399-2017; (2) insufficient practical skills in assembling light steel construction frameworks; and (3) the absence of structured technical training programs accessible to the local craftsmen and residents. Previous studies have consistently demonstrated that hands-on, practice-based training is an effective approach for enhancing the technical competencies of communities in the construction sector.

Grounded in this context, the Community Service Team of Universitas Kristen Indonesia (UKI), in collaboration with PT Kencana Maju Bersama and the Indonesian Work Application Practitioners Association (Himpunan Aplikator Pekerjaan Indonesia/HAPI), organized the "Light Steel Construction Installation Training" for the residents of Cawang Urban Village. The program was designed to achieve two primary objectives: (1) to enhance community knowledge concerning light steel materials, their properties, profiles, and installation standards as stipulated by SNI 8399-2017; and (2) to improve community skills in independently assembling light steel construction framework models.

Figure 1. Map of Cawang Urban Village

IMPLEMENTATION AND METHODS

This community service program (PKM) was implemented using a Participatory Community Empowerment approach, which positions community members as active subjects rather than mere program recipients. This paradigm shifts the orientation of community service from "Working for Community" to "Working with Community," facilitated through Community Deliberation Forums (Forum *Rembug Warga*/Focus Group Discussion). The program was carried out across four sequential stages:

Stage 1: Preparation and Orientation

This stage encompassed the formation of the community service team, the designation of participating faculty members and students, the processing of official permits and program legalization, and the preparation of training materials. This stage functioned as an initial coordination mechanism with partner communities to identify needs, map local potentials, and inventory existing challenges within Cawang Urban Village.

Stage 2: Field Observation

The team conducted direct field surveys within the residential environment of Cawang Urban Village to assess the prevailing condition of infrastructure and vernacular buildings. The methodology employed was primary data collection, encompassing site surveys, written documentation and photographic records, community interviews, and on-site inspections. Observation findings served as the evidence base for designing contextually appropriate intervention programs.

Figure 2. Field Observation

Stage 3: Program Implementation

The implementation stage comprised two primary components: (1) Socialization and Extension, consisting of instructional presentations covering the introduction of light steel materials and their characteristics, types of steel profiles in accordance with SNI 8399-2017, connector tools and equipment, cutting methods, and installation techniques; and (2) Practical Training, which constituted a hands-on working session in which participants assembled miniature light steel ceiling and partition frameworks based on prepared working drawings. Participants practiced measurement, cutting, profile arrangement, and joining using electric drills and light steel screws.

Stage 4: Evaluation and Follow-Up

The final stage encompassed an evaluation of training outcomes, the awarding of certificates to participants, and discussions regarding program sustainability mechanisms. Evaluation was conducted directly against participants' assembled products, assessed on the basis of dimensional accuracy and construction quality in accordance with the working drawings.

RESULTS AND DISCUSSION

Preparation and Coordination

The preparation stage was carried out through a series of coordinated meetings among the UKI team, Cawang Urban Village authorities, PT Kencana Maju Bersama, and HAPI. This process encompassed problem identification, community aspiration gathering, and local potential mapping. The initial coordination proved instrumental in establishing trust among partner stakeholders and ensuring the program's alignment with the actual needs of the residents.

Field Observation

Field surveys conducted in Cawang Urban Village confirmed that the majority of buildings within the densely populated residential area still utilize conventional materials for ceiling and partition frameworks. Interview outcomes with residents and community leaders revealed a high level of enthusiasm and demand for technical training in light steel construction. These findings reinforced the contextual relevance of the designed program.

Socialization and Extension Activities

The socialization session was conducted on a Wednesday, featuring resource persons from PT Kencana Maju Bersama and HAPI. Topics covered included: an introduction to light steel and its material characteristics, the types of light steel profiles in accordance with SNI 8399-2017, an introduction to connector tools and working equipment, cutting and joining techniques, and construction methods for ceiling and partition frameworks. The socialization session was highly interactive, evidenced by the volume of questions posed by participants, reflecting strong interest in the practical application of light steel construction for residential buildings and public facilities.

Figure 3. Atmosphere of socialization

Light Steel Construction Practical Training

The practical training was conducted over a three-hour period at the outdoor area of the urban village office, facilitated by the UKI technical team alongside instructors from HAPI and PT Kencana Maju Bersama. Participants predominantly members of the craftsmen community in Cawang Urban Village were given the opportunity to assemble miniature ceiling and partition frameworks based on prepared working drawings. The process encompassed measurement and cutting of light steel profiles using power cutting machines and manual shears, component arrangement, and structural joining using electric drills and light steel screws.

The floor plan of the ceiling frame and partition structure to be utilized in the installation training is presented in Figure 3.

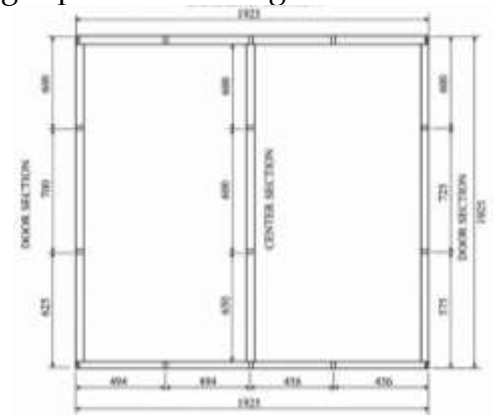

Figure 4. Ceiling and Partition Layout Plan

In addition to the ceiling and partition layout plan, cross-sectional drawings of several frame components intended for use during the training conducted in Cawang Sub-district were also prepared. Figure 5a, 5b, 5c, 5d illustrates the types of frames to be employed in the training, utilizing light steel construction. Based on the layout plan and frame type drawings that will be installed during the field training, the final design is presented in Figure 4e below.

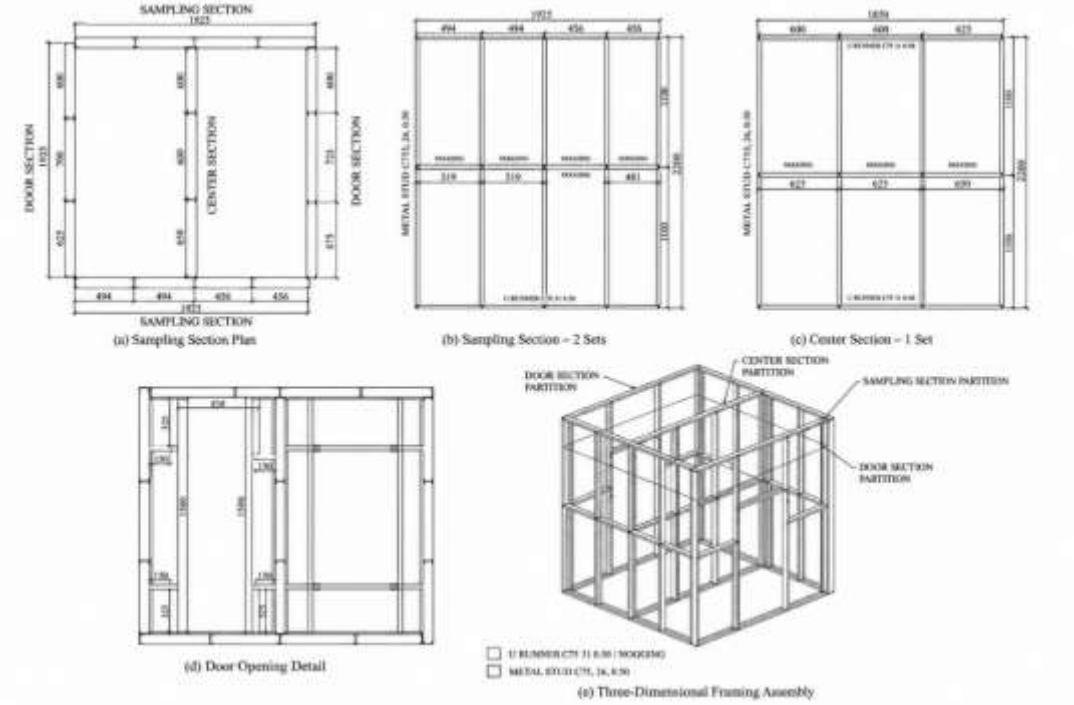

Figure 5. a) Section A-A Figure; b) Section B-B Figure; c) Section C-C; d) Section D-D; and e) Final Design of Frame Installation Using Light Steel Construction

Figure 6. Light Steel Construction Installation Practices

Field evaluation results demonstrated that 85% of participants were able to assemble frameworks with satisfactory structural accuracy and in compliance with the occupational safety procedures that had been instructed. Participants exhibited a high degree of adaptability in operating equipment and adhering to work procedures. This finding is consistent with prior research indicating that project-based learning methods effectively enhance technical competencies within short training durations.

Figure 7. Figure Photo between the PKM Team and Cawang Village Officials

Program Outputs

The community service program generated several concrete outputs, namely: (1) physical products in the form of small-scale light steel ceiling and partition framework models, donated to the urban village office as educational media;

Figure 8. Prototype of Light Steel Ceiling and Partition

(2) training certificates awarded to all participants; (3) comprehensive activity reports accompanied by photographic documentation; and (4) a scientific article published in a community service journal. The contribution of PT Kencana Maju Bersama through the provision of light steel materials, working tools, and the distribution of simple equipment to top-performing participants significantly contributed to the smooth execution and overall success of the program.

CONCLUSIONS AND RECOMMENDATIONS

The Community Service Program (PKM) themed "Light Steel Construction Installation Training," organized by Universitas Kristen Indonesia (UKI) in collaboration with PT Kencana Maju Bersama and HAPI in Cawang Urban Village, East Jakarta, successfully achieved its stated objectives. Through a combination of interactive socialization and practical training, participants acquired a comprehensive understanding of light steel material characteristics, installation protocols in accordance with SNI 8399-2017, and independent skills in framework assembly. Evaluation results confirmed that 85% of participants successfully assembled frameworks in compliance with established technical standards.

Beyond generating immediate benefits through individual competency enhancement, the program also facilitated the formation of a collaborative network among the higher education institution, the urban village government, and industry partners. This tripartite collaboration model may serve as a replicable reference framework for similar programs in other densely populated urban areas. The success of this program underscores the critical importance of synergy among academic institutions, industry partners, and local government in advancing the quality of human resources grounded in technical competence. It is therefore recommended that analogous programs be extended to other urban villages across East Jakarta with comparable demographic and socioeconomic characteristics, in order to accelerate a development trajectory rooted in the strengthening of local capacity.

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