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Improving Knowledge and Skills of Steel Frame Construction of Cawang Community, East Jakarta City

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A B S T R A C T

Nowadays, wood material is very difficult to obtain because it is expensive and limited in quantity. This makes people look for other alternatives as construction materials and Steel Frame is one of the alternatives that is quite popular because it is easy to apply and will not be damaged by termites. Human resources are one of the important factors in determining the productivity of steel frame work. Therefore, they are needed who have competence in their fields in installing the steel frame. The activity aims to: increase knowledge through socialization and increase community skills in the practice of assembling steel frame construction model. The expected benefit is that the partner community has the knowledge and skills to make simple steel frame construction.

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INTRODUCTION

Cawang Sub-district, located in Kramat Jati District, East Jakarta, is one of the densely populated areas with a population of 39,126 people. Along with the development of urban areas, the problems faced by the community in this area are increasingly complex. One of the prominent challenges is the limited availability of wood materials, especially teak wood, which is increasingly difficult to obtain and expensive (Meraj, 2024). This encourages people to look for alternative construction materials that are easier to apply and durable. Steel frame is a solution that is in great demand because in addition to being easy to install, this material is also more resistant to damage such as termite attacks. Steel frame is a type of steel alloy which contains several metal elements. After cooling, this material is formed by reprocessing the composition of its atoms and molecules until it becomes light and flexible steel (Nugroho, 2015). Human resources are one of the important factors in determining the productivity of steel frame work (Riski & Yulianto, 2023). However, the use of steel frame as a construction material requires special knowledge and skills, especially in installing roof construction. The limited knowledge and skills of the community in utilizing steel frame are obstacles in maximizing the potential of this material. Therefore, efforts are needed to increase the capacity of the community in using steel frame materials, both in terms of knowledge about the characteristics of the material and its application techniques in construction.

From the background above, the Main Problems of the Cawang Urban Sub-district Residential Area can be described as follows:

a. The problem of the need for alternative materials other than wood which is limited and expensive. The need for steel frame construction as an alternative material that is easy to apply and termite-proof.
b. The problem of the need for human resources who have competence in their fields in installing steel frame for roof construction due to the lack of public knowledge of steel frame materials including material properties, forms of steel frame profiles according to applicable standards SNI 8399-2017.
c. The problem of the lack of community skills in the practice of assembling steel frame construction model.

Based on the above problems, to overcome and find solutions to the problems, the Community Service Team together with partners from Cawang Sub-district intend to empower the Community in Cawang Sub-district by determining a community service topic entitled Improving Knowledge and Skills of Steel Frame Construction of the Cawang Sub-district Community, Kramat Jati District, East Jakarta City. The Community Service Activities of Universitas Kristen Indonesia located in Cawang Sub-district, East Jakarta City, began by exploring the active participation of the Cawang Sub-district Community, starting from identifying potential and problems, assisting in preparing a program for handling problems.

The Community Service Program implemented by Universitas Kristen Indonesia in Cawang Sub-district, aims to improve the knowledge and skills of the community in Steel Frame construction. Through socialization and training, this program is expected to be able to provide a significant contribution in answering problems in the area. This activity is also part of an effort to empower the community so that they are able to use steel frame as a more efficient and economical construction solution. The expected benefits of this service are that the Cawang Community has the knowledge and skills to make simple steel frame construction. The knowledge and skills include the Transfer of Science and Technology to partners consisting of practical knowledge, how to use tools, techniques for cutting steel frame, techniques for making steel frame joints, and methods for installing roof trusses. This Community Service Plan is in accordance with the 2020-2024 roadmap of the Community Service Master Plan of the Universitas Kristen Indonesia, namely Infrastructure. The basic concept of Universitas Kristen Indonesia is that community service must be unique and the result of superior research.

IMPLEMENTATION AND METHODS

The Community Service Activity of Universitas Kristen Indonesia with the title Improving Knowledge and Skills of Steel Frame Construction of Cawang Sub-district Community, Kramat Jati District, East Jakarta City, in general aims to: 1) Increase knowledge through socialization and counseling to the Community regarding knowledge of steel frame materials including material properties, forms of steel frame profiles according to applicable standards SNI 8399-2017; and 2) Improve Community skills in the practice of assembling steel frame construction model. In order to achieve these goals, the approach that will be used is through a mentoring and community empowerment approach with the concept of changing the Community Service paradigm from "Working For Community" to "Working With Community" through the Community Discussion Forum (Focus Group Discussion) to prepare a community service plan that is based on local Potential and Problems (bottom up) in order to improve Community Empowerment.

The implementation of the community service program to improve knowledge and skills in Steel Frame construction for residents of Cawang Sub-district, Kramat Jati District, East Jakarta, was carried out through several structured stages in September 2024. The first stage is preparation or orientation, which includes the formation of a community service team, involving lecturers and students, managing permits, and preparing activity materials. This stage also involves initial coordination with partner communities to identify their needs and assess the potential and problems in the area.

Figure 1. Coordination with the Head of Cawang Subdistrict

The goal is to collect relevant information to form follow-up activities, so that existing problems can be addressed and appropriate solutions can be provided. Activities at this stage include an inventory of problems and mapping of community needs and potential.

The second stage is field observation in Cawang Sub-district, where a direct assessment of the subdistrict condition. Primary data is collected through location surveys, written data collection, photo documentation, interviews with local officials, and site reviews. This stage aims to identify the potential and problems of existing infrastructure, so that the results can be used as a guide for making improvements. In addition, a coordination meeting (focuss group discussion) is held involving community leaders and related parties to ensure a collaborative approach.

Figure 2. Observation in Cawang Subdistrict

Figure 3. Cawang Community

The third stage is the implementation of activities, which consists of three main processes: 1) socialization to improve public understanding of steel frame materials, starting from material properties, standard profiles, to steel frame construction techniques according to applicable standards (SNI 8399, 2017); 2) training involving participants in direct practice of assembling steel frames, where they are actively involved to improve their skills; and 3) evaluation and discussion of the results of the participants' work, so that they get feedback and can improve their skills.

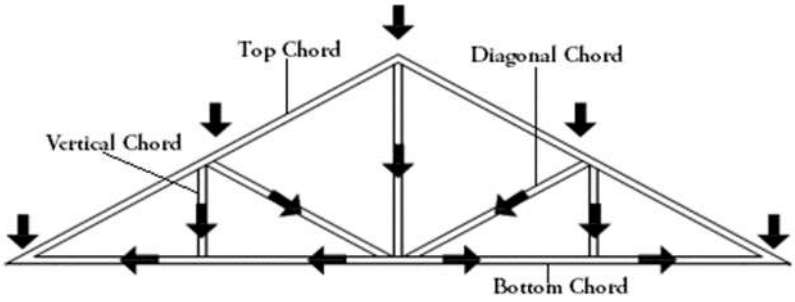
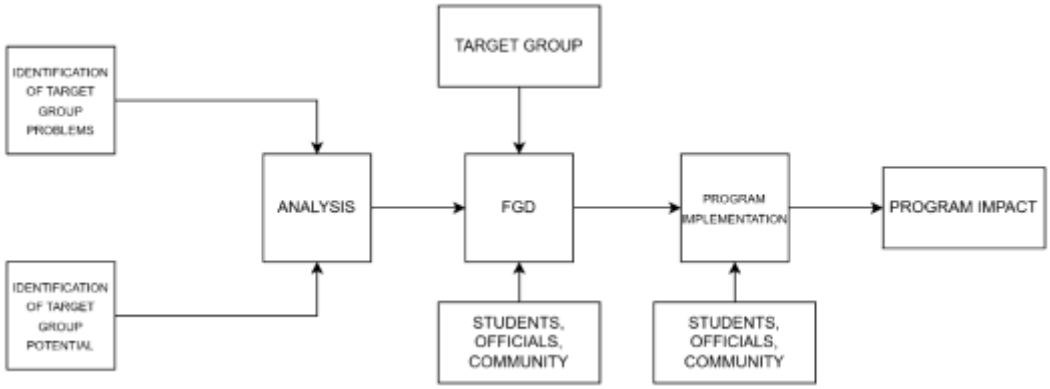


Figure 4. Steel Frame Roof Construction

The last stage is mentoring, evaluation, and sustainability. This stage aims to ensure that the programs that have been implemented can continue to run well and sustainably in the community, and to carry out follow-up as needed. The sustainability of this service, especially in relation to productive target partners (The Cawang Sub-district craftsman community), is expected to apply the usefulness of the steel frame construction training knowledge in the work of partner communities as craftsmen. The framework of the implementation method can be seen in the flow diagram in Picture 5.



Fgure 5. Conceptual Framework

The target partners of the community service activities are productive economic communities with the social status of partners being the *tukang* community. The number of partners is around 20 people. The education of the partners is mostly high school. The problem areas of the partners are advanced materials, and the level of empowerment achieved is in the form of increased knowledge and increased skills.. The distance between Universitas Kristen Indonesia and the target partner (Cawang Sub-district) is relatively close because the proposing university is in the same Sub-district as the target partner, less than

50 km. The contribution of the target partner in devotion becomes the subject of the activity as an actor who plays an active role in participating in socialization, participating in the training and design. The role of the local government in this case the Cawang Sub-district apparatus provides support for the implementation of the activity, provides permission for the implementation of the activity and provides a place for socialization, training and design.

RESULTS AND DISCUSSION

The Community Service Program in Cawang Village has been implemented by the Architecture Study Program, Faculty of Engineering, Universitas Kristen Indonesia (UKI) since May 2009 in the greening and outreach program in Cawang Subdistrict, East Jakarta. The 2024 Community Partnership Program can be a continuation of the Community Service program that has been implemented by the Architecture Study Program, Faculty of Engineering, UKI in previous years. The following is a table of community service activity programs that started in 2009 (See Table 1).

Table 1. Table of Community Service Activity Programs

No.	Years	Name of Activity
1	2009-2010	UKI Green Sub-district Counseling.
2	2011-2012	Socialization, Green Creation Competition, Counseling & Workshop on waste management, Painting the Facade of Residential Unit Walls in one selected alley.
3	2013-2014	Waste Management, Evaluation of Cawang Village Area Conditions, Management of Waste Bank Operational System, Green Environment and Recycling Creativity Competition from Waste, Organic & Non-organic Waste Management, Waste Bank.
4	2015-2016	Green village counseling with hydroponics, Green Environment Competition Socialization and material distribution, Waste bank evaluation, Counseling on renewable energy, Green Environment Competition.
5	2017-2018	Green Village Extension, Composting, Hydroponics and Greenwall Painting.
6	2019	Counseling and Workshop on Composting, Planting with Hydroponics, students carried out Green Wall painting activities in Cawang Subdistrict.
7	2022	Workshop and Creative Competition for Utilizing Recycled Waste (Sudarwani et al, 2022) In Cawang, East Jakarta.
8	2023	Mini Garden Making and Alley End Improvement Competition in Cawang Subdistrict, East Jakarta (Sudarwani et al., 2023).

Community Service activities carried out by the Universitas Kristen Indonesia in Cawang Sub-district, Kramat Jati District, East Jakarta, have succeeded in providing significant benefits in accordance with the initial objectives of the program, namely increasing community knowledge and skills in Steel Frame construction.

Through a series of socialization, training, and focus group discussions (FGD), several outputs have been achieved as follows:

Increasing Public Knowledge

The socialization and counselling conducted have succeeded in increasing public knowledge regarding steel frame, starting from material properties, profile shapes, to the applicable SNI 8399-2017 standards. Through presentations and explanations regarding the types of Steel Frame profiles, connection tools, and proper construction techniques, the public gained new insights into the use of steel frame in construction. Based on the evaluation results, most participants stated that there was an increase in understanding regarding the material presented. This can be seen from their active participation during the activity, where many participants asked questions and provided input during the discussion.

Figure 6. The Indoor Socialization

Figure 7. Participants of Cawang Community

Picture 8. Local Government and Community Service Team

Improving Community Skills

Direct training provided to the community in assembling steel frames has improved their practical skills. The community is involved in the practice of making steel frame trusses according to the working drawings provided. The following is documentation of the steel frame workshop activities.

Figure 9. Outdoor Training

Figure 10. Steel Frame Workshop

As a result, the community is not only able to assemble the frames correctly, but is also skilled in using tools such as cutting machines, steel frame scissors, and electric drills. These new skills are considered important because they allow the community to apply steel frame in construction, both for personal needs and in community projects.

Social and Product Model Development

One of the important outputs of this activity is the formation of a sustainable community empowerment model. Focus group discussions (FGD) involving community leaders, Sub-district officials, and resource persons from related agencies produced concrete solutions to problems faced by residents, especially in terms of small infrastructure development with steel frame. In addition, the results of the training were also in the form of physical products, namely steel frame model assembled by participants as evidence of the skills they learned.

Figure 11. Photo After Training

Figure 12. Construction Mock Up

Publication and Dissemination of Information

In addition to direct output to the community, this activity also produces output in the form of scientific publications and mass media. Articles on the implementation of this activity are planned to be published in international journal, and disseminated through print and electronic media. This publication aims to expand the reach of the impact of the activity, so that it can be a reference for similar activities in other locations.

Thus, this community service activity not only provides direct benefits in the form of increased knowledge and skills for the community, but also produces long-term outcomes through a social empowerment model and publications that support the widespread dissemination of information. If sorted briefly in the process. First, this event is an opening by the Head of Cawang Subdistrict, the UKI lecturer and also the sponsor. After that the event is a presentation of material about steel frame and the application of steel frame by UKI and the sponsor. After the presentation of the material, the participants were asked to make a mock-up of a steel frame roof construction.

The plan schedule and the real schedule of the Community Service Program entitled Improving Steel Frame Construction Skills for the Cawang Urban Subdistrict Community in East Jakarta City is as follows (See Table 2-3).

Table 2. The Community Service Schedule

No	Activities	August-September 2024							
		1st Week	2nd	3rd	4th	5th	6th	7th	8th
1	Coordination with Sub-district officials and licensing								
2	Socialization to partner communities								
3	Identification, initial survey and secondary data collection								
4	Preparation and Equipment								
5	Socialization and Counseling								
6	Practical training in assembling Steel Frame frames								
7	Monitoring and Evaluation								

8	**Final Report**								
9	**International Journal Publication**								
10	**Publication in the form of news in print/electronic mass**								
11	**Audio visual works in video form**								
12	**Visual work in the form of a poster**								

Table 3. The Activity Program

No	Day	Activity	Place
1	September 27th	Coordination with Sub-district officials and licensing	Cawang Sub-district
2	Sepetember 30th (Indoor)	Introduction Speech	Cawang Sub-district
		Session I: Socialization of Community Service Program	Cawang Sub-district
		Session II: Socialization of Steel Frame Structure & Construction	Cawang Sub-district
		Session III: PT Kencana Baja Ringan & HAPI	Cawang Sub-district
	(Outdoor)	Implementation of Steel Frame Construction Training	Cawang Sub-district

CONCLUSIONS AND RECOMMENDATIONS

The conclusion of the Community Service activity carried out by the Universitas Kristen Indonesia in Cawang Sub-district, East Jakarta, showed success in increasing community knowledge and skills regarding lightweight steel roof construction. This program introduced steel frame as an alternative construction material that is more economical and durable, replacing wood which is increasingly difficult to obtain. Through a series of socialization and practical training, the community can understand the characteristics of stell frame, material standards, and the right techniques for installing steel frame roof construction.

The results achieved include increasing community understanding of materials and skills in assembling steel frames construction, which not only support local construction projects but also strengthen a community in sustainable development. In addition, scientific publications from this activity help disseminate information that is expected to be a reference for similar activities in other areas. With a collaborative and sustainable approach, this program is an effective and beneficial empowerment model for the Cawang community in overcoming existing construction problems.

The results of this activity are expected to provide long-term benefits for participants and the community and become a foundation for a form of sustainable cooperation in the future. Finally, we hope that the cooperation that has been established will continue to develop for the sake of improving the quality of life of the community.

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