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EFFECTIVENESS OF COMPETENCY-BASED TRAINING FOR CONSTRUCTION LABOR IN WEST SUMATERA

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ABSTRACT

The issuance of Minister Regulation of Public Works and Public Housing (PUPR) No. 24/ PRT/ M/ 2014 concerning Competency-Based Training Guidelines in the Construction Services Sector is a strong effort by the government to increase the capacity of sustainable construction human resources in order to produce productive and competent human resources. Therefore, the workforce must-have requirements and a series of specific competencies to carry it out effectively and efficiently. Moreover, these competencies must be under the work they will do. The Kirkpatrick Model is used to evaluate the results of training and learning programs and rates against four levels of criteria: reaction, learning, behavior, and results. This research aims to find out what variables affect the effectiveness of competency-based training based on Kirkpatrick's four levels and see whether the competency training activities effectively increase human resources in construction services. A total of 64 questionnaires were then distributed to relevant respondents who attended the competency-based training held in West Sumatera during the 2017-2018 periods. From the results, there are 4 Kirkpatrick level variables that affect the effectiveness of training, namely the level of reaction (21 indicators), learning (6 indicators), behavior (7 indicators), and results (11 indicators). The variable that shows the most effective results is the variable level of learning as much as 47.51%, followed by results (44.56%), learning (47.51%), and behavior (29.27). It can be concluded that the workforce competency training conducted in West Sumatera from 2017 to 2018 was still less effective.

1. INTRODUCTION

Era 4.0 is an era of digitalization, where innovation and expertise competition are needed. In facing the 4.0 era, the construction industry must improve to increase productivity and performance of construction projects. One of the success factors for construction projects is determined by the level of labor productivity (Hech, 2018; Kodri et al., 2018; Shehata & El-Gohar, 2011). Many construction projects have failed due to labor factors (Maqsoom et al., 2020; Mohd-Rahim et al., 2016). Windopo (Windapo, 2016) emphasizes that the failure of

construction projects occurs due to a lack of skilled and quality labor. This means that companies can efficiently utilize all their human resources to increase the productivity of their workers by providing motivation and training (Molina & Ortega, 2003). For this reason, it is necessary to strengthen the development of human resources (HR) in the formal and non-formal sectors. The issuance of Minister Regulation of Public Works and Public Housing (PUPR) Number 24/ PRT/ M/ 2014, concerning Competency-Based Training Guidelines in the Construction Services Sector, is a strong effort by the government to increase the capacity of sustainable construction human resources. The regulation is to produce productive and competent human resources, both those carried out by the central government through the Regional Construction Training Center and through the government of every province in Indonesia. The government also emphasizes this in Law Number 2 of 2017 about Construction Services. In Article 70, it is stipulated that "every construction worker who works in the field of construction services is required to have a work competency certificate."

According to data from the Ministry of PUPR (PUPR, 2018), the number of construction workers who have certification is still small until 2018. Of the 8.3 million Indonesian construction workers, only 7.4% have certificates, namely 616,000 people with 419,000 skilled workers and 197,000 expert workers. Meanwhile, for 2019, the government is targeting a minimum increase of 512,000 certified construction workers.

In West Sumatera, during the period 2014 to 2015, the number of human resource training in construction services has increased more than 3 (three) times, with a total of 5 (five) competency-based training activities in 2014 and 17 (seventeen) activities (Asrini, 2017). Furthermore, this will continue to increase in line with the targets set by the government because this certification training is expected to increase productivity, quality, and effectiveness of worker competencies.

1.1. Training and Competence

Based on the PMBOK (2000), training is a tool and method used in the human resource development process, which is part of human resource management. Article 1 paragraph (9) of Law No.13 of 2003 concerning Manpower states that training is all activities to provide, obtain, improve, develop work competence, productivity, discipline, attitudes and work ethic at specific skill levels according to levels and qualifications, position and job. Meanwhile, (Desler, 2013) states that training means giving employees the skills needed according to job needs.

From several definitions of training, it can be concluded that training is a series of processes, both general, technical, and managerial, that are carried out to increase the level of competence of human resources, which will improve performance. According to Article 9 of Law Number 13 of 2003 concerning Manpower, human resource training aims to equip, improve, and develop work competencies to increase capability, productivity, and welfare. In addition, human resources training also aims to cover the gap between the required job competencies and the competence of human resources.

To perform in any job, the workforce must have some requirements and a series of specific competencies to carry it out effectively and efficiently. Furthermore, these competencies must be following the work they will do. According to Bartram,D & Roe (2005), competence is a list of abilities/ skills possessed by a person in their environment. Meanwhile, according to Law No. 13 of 2003 concerning Manpower, competence job is the ability of each individual

to work, which includes aspects of knowledge, skills, and work attitudes under established standards.

The development of competency areas is affected by the market needs, technological innovation, and work systems (Blázquez et al., 2018). **Figure 1** describes the change in the concept of competence from the old concept to the current concept. According to Tippelt (2003), the qualification of competence longer influenced by three factors: environment, expertise *(skills)*, and *physical labor*, and the old concept influenced by five factors: long working experience *(length of learning phase)*, the ability to communicate and cooperate (*communication and cooperation abilities*), knowledge, responsibility and brainwork.
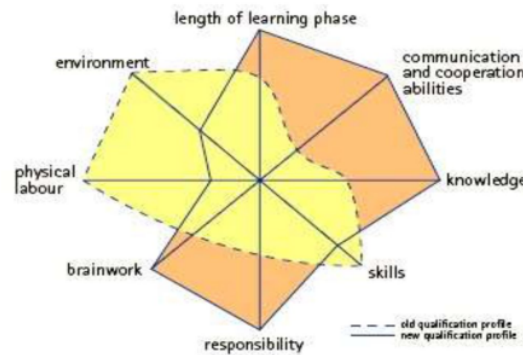

Figure 1. Changes in the Concept of Competence (Tippelt R, 2003)

1.2. Competency-Based Training in Indonesia

HR training for Indonesian construction services is organized based on the Minister Regulation of Public Works and Public Housing number 24/ PRT/ M/ 2014 concerning Competency-Based Training Guidelines in the Construction Services Sector. In the ministerial regulation, it is stated that competency-based training is job training that focuses on mastering work abilities that include knowledge, skills, and work attitudes according to the standards and requirements set in the workplace.

Currently, the construction training and competency development center (PUS-BIN KPK) of the Ministry of Public Works has produced 155 National Work Competency Standards (SKKNI) in the construction sector, as attached in Table 1 below.

Table 1. SKKNI in Construction (Source: Sibima.pu.go.id)

No	SKKNI Year	Number of Competencies
1	SKKNI 2009	30
2	SKKNI 2010	18
3	SKKNI 2011	1
4	SKKNI 2013	6
5	SKKNI 2014	51
6	SKKNI 2015	42
7	SKKNI 2016	7
Total Competence		155

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The Kirkpatrick level is a common method used to evaluate training and learning programs (Alsalamah & Carol, 2021). The four-level evaluation model is an evaluation model developed by Dr. Donald Kirkpatrick based on the category of results from each level of evaluation (Noe A, 2010), namely:

a. Reaction level is evaluated reactions to satisfaction. Satisfaction can be viewed from the material provided, the strategy for delivering the material, the available learning media, and the consumption presented.
b. The learning level evaluates whether participants can understand the objectives of learning which consist of increasing knowledge, increasing skills, and improving attitudes during training. The learning level is a level that helps measure participants in making decisions to decide on jobs that are suitable for learning.
c. Behaviour Level evaluates the attitude of participants after attending the training.
d. Result level focuses on the final results of participants after participating in training, such as increasing productivity, reducing work accidents, improving work attitudes and teamwork. The resulting level is an evaluation that states the impact of the program on the trainees.

Based on the background, the objectives of this research are: 1. Identifying the variables that affect the effectiveness of competency-based training based on Kirkpatrick's four levels; 2. Analyzing the effect of competency-based training activities on improving human resources in construction services in West Sumatera.

2. RESEARCH METHOD

This study used statistical analysis alongside quantitative research methods to provide deeper analysis and information when evaluating competency-based training activities for human resources in West Sumatera construction services. The data for this study was collected in training activities in the 2017-2018 periods. A survey was developed to gather information about evaluation training programs. The survey was designed based on the levels adapted from the Kirkpatrick model through close-ended questions distributed according to the number of samples that had been determined, namely the number of 64 people.

The choice of Kirkpatrick's four-level evaluation model concept is also based on the fact that Kirkpatrick's evaluation model involves multiple objectives and parties at each level of evaluation (Lin et al., 2011). Because the research concept is carried out with an approach based on achieving goals, it is necessary to see the relationship between the level of training evaluation and competence, as shown in **Figure 2** and **Table 2** below.
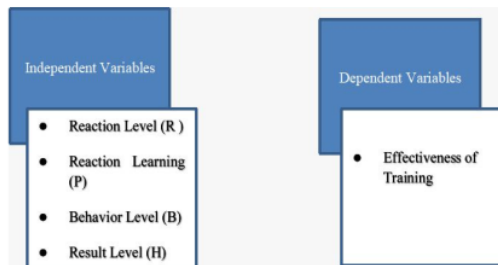
Figure 2. Research Concepts

Table 2. Operational Concepts

No	Variable	Indicator	Method and Measuring Instrument	Measuring Scale
1	Reaction	Satisfaction of training participants with materials, instructors, training facilities, foods, workspace, and others	Questionnaires of participants	Ordinal (uses a Likert scale)
2	Learning	Changes in the knowledge, skills and attitudes of participants during the training.	Questionnaires of participants	Ordinal (uses a Likert scale)
3	Behavior	Changes in the behavior of participants after participating in training which is implemented in a work environment which includes work attitudes, communication, and taking action	Questionnaires for participants, leaders, or colleagues	Ordinal (uses a Likert scale)
4	Result	Impact on the company, productivity, work quality, time effectiveness	Questionnaires for participants, leaders, or colleagues	Ordinal (uses a Likert scale)
5	Effectiveness	Respondent's views on the effectiveness of training increase competence	Questionnaires for participants, leaders, or colleagues	Ordinal (uses a Likert scale)

3. RESULTS AND DISCUSSION

3.1. Data and Analysis Respondents Research

From 64 respondents, the distribution based on age, the dominant respondents were in the age group of 20 to 30 years as many as 56.3%, namely 36 people. Meanwhile, based on the education level of respondents, the highest proportion was high school graduated as much as 48.4% and followed by diploma graduated as much as 20.3%. For long experience working, respondents who attended the most competency training worked for less than one year (40.6%) and followed by more than five years as many as 22%. For more details regarding the respondent's data, see **Figure 3** below.
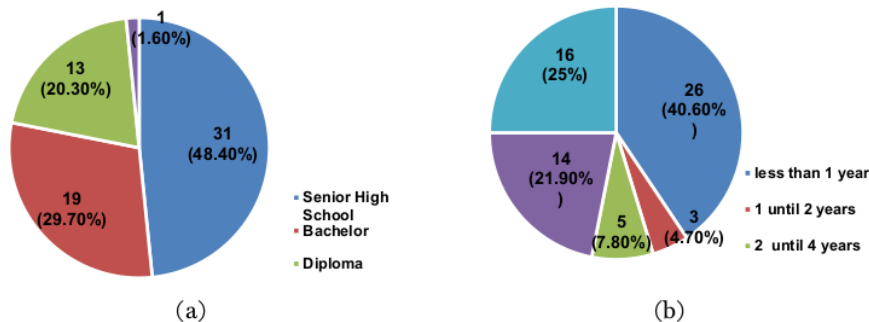
(a)   (b)

Figure 3. Characteristics of the respondents (a) education level (b) length of work experience

3.2. Test Validity, Reality, and Normality of Research Instruments

Each indicator's validity and reliability test on the 4 level variables of the research instrument was carried out using the program *SPSS* with the Method Alpha-Cronbachfor for each level of research instrument variables. The indicator is declared valid if *r count> r table value* for N sample 35 with a significant 5% and 1% level. Meanwhile, the indicator is declared valid if the A*lpha-Cronbach value is* > 0.70.

The data normality test, it is carried out to see whether the data obtained is normally distributed or not. Data distribution is needed to determine data categories based on the value of *cut-off points* data. Variables with normally distributed data use the value *mean* as the *cut-off point.* Meanwhile, for variables with data not normally distributed using the *median* as the *cut-off point.*

3.3. Effectiveness Analysis at Kirkpatrick's Four Levels

3.3.1. Reaction Variables

At the level of reaction, 21 indicator items will describe the level of respondent satisfaction with the training. Training is considered effective if the level of reaction, which states the average respondent's satisfaction score is above the *cut-off point* 4. **Table 3** presents the average score of the respondent's satisfaction assessment on the respondent's level of reaction to the training.

Table 3. Mean Score of Training Effectiveness for Reaction Variables

No	STATEMENT	Linkert Scale Range					Total Score	Average Score	Cut-off Points Median	Interpretation
		1	2	3	4	5				
R1	All material provided is in accordance with the training area.	2	1	1	34	15	218	4.11	4.00	Effective
R2	The material given is based on the competency unit in the training field.	2	1	1	34	15	218	4.11	4.00	Effective
R3	the instructor mastered the training material provided and was able to answer questions from participants clearly.	2	2	10	31	8	200	3.77	4.00	Not Effective
R4	the instructor delivers the material in a communicative, clear, and systematic manner.	1	3	11	32	6	198	3.74	4.00	Not Effective
R5	the instructor can motivate participants to participate in training activities according to the material presented.	1	4	10	27	11	202	3.81	4.00	Not Effective
R6	the instructor can invite participants to discuss each training material actively.	1	2	9	30	11	207	3.91	4.00	Ineffective
R7	task/exercise at the end of the activity session is given so that participants can further explore the material that has been given.	1	0	7	29	16	218	4.11	4.00	Effective
R8	Training time conditions do not interfere with work activities	2	3	14	25	9	195	3.68	4.00	Ineffective

No	STATEMENT	Linkert Scale Range					Total Score	Average Score	Cut-off Points Median	Interpretation
		1	2	3	4	5				
R9	Training activities are in accordance with the schedule that has been given.	1	1	5	33	13	215	4.06	4.00	Effective
R10	time provided for each training material is sufficient.	1	4	8	32	8	201	3.79	4.00	Ineffective
R11	Room capacity can accommodate all training participants	1	2	3	29	18	220	4.15	4.00	Effective
R12	Props/presentation media used when delivering material helps participants understand the content of the material.	1	3	8	36	5	200	3.77	4.00	Ineffective
R13	module /handout Training helps participants understand the material presented	1	3	8	29	12	207	3.91	4.00	Ineffective
R14	You are satisfied with the consumption provided.	1	4	3	27	18	216	4.08	4.00	Effective
R15	The training that you had was fun.	1	2	7	27	16	214	4.04	4.00	Effective
R16	training that was followed gave practical value	1	0	5	35	12	216	4.08	4.00	Effective
R17	You are motivated to apply training materials	1	0	9	25	18	218	4.11	4.00	Effective
R18	the response of the committee in serving the participants is very good.	1	0	7	29	16	218	4.11	4.00	Effective
R19 T	the information provided by training organizers is very good.	1	1	6	30	15	216	4.08	4.00	Effective
R20	You really need a training activity that is followed.	1	1	4	22	25	228	4.30	4.00	Effective
R21	Overall, what do you think of the training activities that you participated in?	2	0	3	29	17	212	4.00	4.00	Effective

Note: 1=strongly disagree, 2= disagree, 3= neutral, 5= agree strongly

From **Table 3** above, it can be seen that the indicators R3, R4, R5, R6, R8, R10, R12, and R13, the interpretation of the respondent's results stated that it was not effective. Respondents who expressed dissatisfaction were found in the instructor indicators, time, teaching aids, and modules. In comparison, the distribution of the respondent's satisfaction level on the reaction variable is depicted in **Figure 4**. The pie chart of the frequency distribution of the respondents to the reaction variable shows that the respondent satisfaction is greater than the participant unsatisfaction, so the evaluation of training at the reaction level can be interpreted effectively.
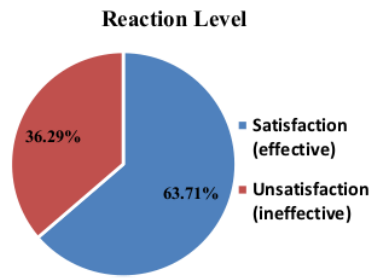
Reaction Level

Figure 4. The frequency distribution of respondents to the reaction variables.

3.3.2. Learning Variables

At the learning level, there are six indicators that will describe the level of understanding of the respondents towards the training. Training is considered effective if the level of learning, which states the mean score of the respondent's understanding, is above the *cut-off point* 4. **Table 4** presents the average score for the assessment of the respondent's understanding of the respondent's learning level at the training.

Table 4. Mean score of training effectiveness for learning level

No	STATEMENT	Linkert Scale Ranging					Total Score	Average Score	Cut off Points Median	Interpretation
		1	2	3	4	5				
L1	Communication and Cooperation Material in the Work Environment	1	1	9	32	10	208	3.92	4.00	Ineffective
L2	Material Making Work Schedule	1	1	12	27	11	202	3.81	4.00	Ineffective
L3	Material Safety and Health Work and Environment (K3-L)	2	2	32	16	1	171	3.23	4.00	Not Effective
L4	Material to Make Work Implementation Reports	1	2	6	29	15	214	4.04	4.00	Effective
L5	Specific materials that are in accordance with the training that is being followed	1	1	7	30	14	214	4.04	4.00	Effective
L6	The extent to which you feel you have learned from the training program.	2	0	7	29	15	214	4.04	4.00	Effective

Table 4 above indicates that L1, L2, and L3 result in the ineffective interpretation of the respondents' results. The level of understanding of respondents who stated that they did not understand was found in indicators of communication and cooperation materials in the work environment, making work schedules, and occupational safety and health and environment (K3L) materials. The distribution of the respondent's level of understanding at the learning level is depicted in **Figure 5**. Based on Figure 5, the high level of understanding of the respondents is higher than the level of understanding of the low-level participants, so the evaluation of training at the learning level can be interpreted effectively.
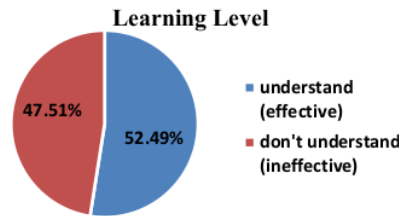
Learning Level

Figure 5. The frequency distribution of respondents to learning

3.3.3. Behavioral Variables

There are 7 indicators that describe the level of implementation of the participants' behavior at the behavioral level after attending the training. Training is considered effective if the level of behavior, which states the average score for implementing participant behavior after participating in the training is above the *cut-off point value.* **Table 5** presents the mean score of respondents' assessment on the implementation of the trainees' behavior after attending the training.

Table 5. Mean score of training effectiveness for behavior level

No	STATEMENT	Linkert Scale Ranging					Total Score	Average Score	Cut off Points Median	Interpretation
		1	2	3	4	5				
B1	After participating in the training, you become more disciplined.	0	1	13	38	12	253	3.95	4.00	Not Effective
B2	After attending the training, you become more responsible for all things.	1	2	9	40	12	252	3.94	4.00	Ineffective
B3	After attending the training, you become more independent	0	1	10	44	9	253	3.95	4.00	Ineffective
B4	After participating in the training, you become more motivated at work	0	2	6	38	18	264	4.13	4.00	Effective
B5	After participating, Your training becomes tidier in storing the drawing equipment that has been used.	0	3	9	36	16	257	4.02	4.00	Effective

From table 5 above, indicators B1, B2, and B3 result in the respondent's interpretation stating ineffective. The level of implementation of the trainees' behavior after participating in the training is not effective in the indicators of behavior change in communication, cooperation, discipline, responsibility, and the participants' independence. The distribution of the implementation level of the training participants' behavior change at the behavior level is depicted in Figure 6—pie diagram of the frequency distribution of respondents to the behavior variables. Based on Figure 6, the implementation level of the training participants' behavior change after participating in the training is lower than the implementation level where there is no change in the behavior of the trainees after attending the training, so the training evaluation at the behavior level can be interpreted ineffectively.
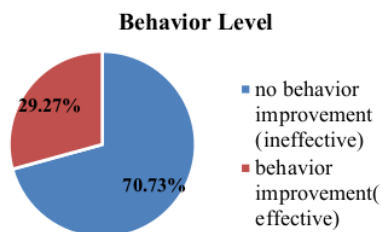
Behavior Level

- no behavior improvement (ineffective)
- behavior improvement(effective)

29.27%

70.73%

Figure 6. The distribution of respondents' frequencies towards behavioral

3.3.4. Outcome Variables

At the yield level, 11 indicators will describe the impact of training on productivity, work quality, and time efficiency of training participants. Training is considered effective if the level of impact of the training on training participants, as stated in the average score on the productivity, work quality, and time efficiency of participants after attending the training, is above the *cut-off point value.* Table 6 presents the average score of respondents' assessment of training participants' impact after attending the training.

Table 6. The mean score for the level of training effectiveness results

No	STATEMENT	Linkert Scale Ranging					Total Score	Mean Score	Cut off points	Inter-pretation
		1	2	3	4	5			Median	
H1	Demonstrate training materials at your job.	0	3	15	38	8	243	3.80	4.00	Not Effective
H2	Training can change your perspective, way of thinking, attitudes, and behavior	0	3	7	38	16	259	4.05	4.00	Effective
H3	Training really helps you in doing your job better.	0	1	7	41	15	262	4.09	4.00	Effective
H4	Training really helps you complete work with satisfactory results.	0	4	9	39	12	251	3.92	4.00	Not Effective
H5	Training helps you to manage and make good use of your time.	0	2	9	44	9	252	3.94	4.00	Not Effective
H6	Training can improve your skills in doing work.	0	2	9	43	10	253	3.95	4.00	Not Effective
H7	Training can improve your skills in determining the needs for tools and materials used to carry out work.	0	3	7	38	16	259	4.05	4.00	Effective
H8	Training Able to improve your skills in making work schedules	1	2	8	37	16	257	4.02	4.00	Effective
H9	Training Able to improve you in reading pictures and sketches.		2	5	46	11	258	4.03	4.00	Effective

No	STATEMENT	Linkert Scale Ranging					Total Score	Mean Score	Cut off points	Inter-pretation
		1	2	3	4	5			Median	
H10	Training can improve your skills in making reports on work results.	1	2	10	40	11	250	3.91	4.00	Ineffective
H11	Overall, training is very useful in supporting your work	1	3	4	40	16	259	4.05	4.00	Effective

From **Table 6** above, indicators H1, H4, H5, H6, and H10 result in the interpretation of respondents' results declared ineffective. The level of implementation of training results for training participants after participating in the ineffective training is found in the indicators of practicing training material on the job, training helps complete work with satisfactory results, training helps participants to organize and use time well, training can improve participant skills in carrying out work, and training can improve the skills of trainees in making reports on work results. The distribution of the implementation of the training results to the training participants at the result level is depicted in Figure 6. Based on **Figure 7**, the training participants' implementation level after attending the training with good results is higher than the implementation level of the training results for the training participants with poor results after attending the training. Then the evaluation of training at the outcome level can be interpreted to be effective.
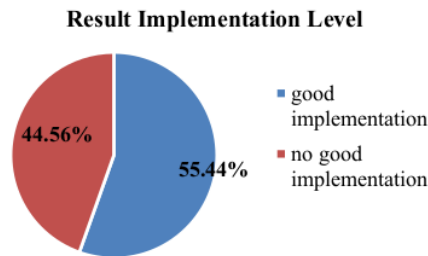
Result Implementation Level

Figure 7. The frequency distribution of respondents to the variable results

4. CONCLUSIONS

This study adapted the Kirkpatrick evaluation model, which includes four levels of training outcomes, to evaluate competency-based training programs for construction services in Sumatera Barat. From the results of the analysis carried out above, there are 4 Kirkpatrick level variables that affect the effectiveness of training, namely the level of reaction (21 indicators), learning (6 indicators), behavior (7 indicators), and results (11 indicators). The variable that shows the most effective results is the variable level of learning as much as 47.51%, followed by results (44.56%), learning (47.51%), and behavior (29.27). It can be concluded that the workforce competency training conducted in West Sumatera from 2017 to 2018 was still less effective.

For this job competency training activity to be more effective, it is better if the recruitment of training participants is carried out by the training participant requirements specified in the Indonesian National Work Competency Standards for the SKKNI and carried out firmly and with discipline. When they finish participating in this training, the goal is that the

participants can feel the benefits in increasing their work competence. In addition, instructors are also expected to be able to prepare training materials or modules according to the expected training fields and competencies by referring to the SKKNI.

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