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Analysis Defect Management in High Rise Building Project in the “XYZ” Company

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ABSTRACT: Customer satisfaction is the goal of every contractor in the construction world. In addition to costs and time, good quality assurance must also be carried out continuously and consistently. But there is no doubt that there are some unexpected things that can happen. If this cannot be maintained, defect work or work defects can occur. Defect is the easiest form of waste to be identified. Defect is waste that appears when the product is not in accordance with the specifications desired by the customer. Defect can only be fixed by rework. This can provide many disadvantages because of loss time for rework and fixed cost for rework. Company PT. XYZ periodically evaluates the quality of work using Total Quality Assessment (TQA) during the construction process to ensure the predetermined standards have been carried out correctly in the project and evaluate the work results of the project team to carry out Quality improvement on future projects. Before being handed over to the owner, a final inspection will be carried out from the internal audit of PT XYZ. Analysis of trend defects that are often found in structural work are porous. For finishing work, tile adhesive are not full and for MEP work the installation is not tidy. Correlation analysis between the number of defect findings and the average TQA value shown that the relationship between the two variables was very weak, so that the TQA value could not be used as a predictor tool for finding defects in the final handover of the project. Correlation analysis between the number of defect findings and contract values found between the two variables there is a strong relationship, so that the value of the existing contract affects the number of defects.

KEYWORDS: construction defects, quality control, quality improvement, quality assessment, customer satisfaction

I. INTRODUCTION

A project is expected to run well and achieve the results of quality time and costs as planned. In this case, it will analyze the quality of the construction at the end of the project handover, which often finds defects in the building. Then the right quality management is needed in order to reduce the findings of defects in the building and get the results that have been determined in accordance with the specifications. Quality management starts from Quality Planning, Quality Assurance, Quality Control and Quality Improvement. Quality planning at the beginning of the project is necessary as a guide during the work process. Good planning and supervision will produce good quality products. So it is required for each subcontractor or direct contractor to plan the quality system on the work to be done. Quality Assurance or quality assurance is a process-based plan to prevent product mismatches starting from the planning process to avoid the occurrence of repair work.

Problems that related to the background above are the factors that caused the defect before the handover of the project, how to overcome so that the defect can be reduced or zero defects, the effect of defects on the handover the purpose of this study is to determine the causes of defects during the implementation process, knowing the effect of Quality assessment on the number of defect findings, knowing the impact of the defect on the project handover. Benefits of research Project management will plan the right system for quality control work, Engineering will make the right method for each job, the Estimator estimates the indirect costs that will be incurred due to the Defect

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II. RELATED WORK

Project quality management involves a process that requires and guarantees that the project will meet the required requirements including all activities involving the overall management functions, including quality policies, objectivity and responsibility and their implementation of quality planning, quality assurance, quality control, and quality improvement. Quality Management Project is an integral part of Construction Project Management, along with Project Cost Management and Project Time Management, in a harmonious balance. According to PMBOK the quality management project process requires three stages that are interconnected with each other during the construction process, the following stages are carried out by project quality management, among others: Quality Planning, quality standard identification process in accordance with planned projects that will done and ways to achieve these quality targets. Quality Assurance, quality implementation that has been planned and ensures all processes are in accordance with the plan so that the quality target is achieved. Quality control, project inspection work activities in accordance with the standards and work instructions that have been determined to reduce the findings of projected nonconformities. Quality Improvement, in the process of Quality Improvement innovation is carried out continuously to meet customer satisfaction, starting from the stages of input, process, and output. At the stage of the process itself continuous action is taken. The plan is to plan a plan to support the innovation process, as a form of product embodiment, then a check is carried out to assist the process of measurement, analysis, and improvement, while the action is carried out as a realization of the highest management responsibilities. In this study the company PT XYZ adopted CONQUAS as a tool for assessing the quality of structural work, architectural and mechanical electrical plumbing.

III. TEXT INPAINTING

The data used in this study is secondary data, namely data obtained from the second party. These data were obtained from contractor companies in the form of TQA assessment data and data on the number of defects in the final inspection phase for structural work, architectural and mechanical electrical plumbing. These data will then be analyzed by statistical methods.

In this study a pareto method and fishbone analysis were conducted to analyze defect management against defect final inspection of the project. These projects were studied further to find out the types of defects and TQA assessments. Then do a correlation analysis between the value of Total Quality Assessment with the number of defect findings in each type of building.

IV. EXPERIMENTAL RESULTS

1. The number of defect findings and the Total Quality Assessment value in each type of building

Table IV.1 The number of defect findings and the Total Quality Assessment value in each type of building

No	Project Name	Total Defect	Allowable Total Defect	Defect percentage	Handover Status	Structure	Finishing	MEP	Average TQA value
Apartement									
1	OPT1	11430	10450	-9%	Not feasible	3,67	3,58	3,38	3,54
2	OPT2	9875	10450	6%	feasible	3,22	3,44	3,52	3,39
3	OPT3	14322	10594	-35%	Not feasible	3,19	3,37	3,54	3,37
4	GR2	4304	6545	34%	feasible	3,20	3,62	3,60	3,47

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5	GC J	4136	4399	6%	feasible	3,02	3,39	3,46	3,29
6	GC K	4307	4399	2%	feasible	3,05	3,38	3,49	3,31
7	GC L	4033	4399	8%	feasible	3,11	3,22	3,39	3,24
8	GC M	3750	4399	15%	feasible	3,09	3,37	3,45	3,30
9	PI 1	21680	31430	31%	feasible	3,06	3,54	3,50	3,37
10	PI 2	26551	31431	16%	feasible	3,09	3,48	3,48	3,35
11	PI 3	26893	27340	2%	feasible	3,08	3,45	3,46	3,33
12	PT 1	32001	53600	40%	feasible	3,29	3,47	3,49	3,42
13	PT 2	27224	43890	38%	feasible	3,18	3,54	3,49	3,40
14	VTB	3317	13500	75%	feasible	3,21	3,49	3,55	3,42
Office									
1	ARC BAG	3005	4750	37%	feasible	3,06	3,23	3,33	3,21
2	BPB	506	700	28%	feasible	3,33	3,43	3,43	3,40
3	BPM	2014	2500	19%	feasible	3,43	3,22	3,43	3,36
4	BPP	573	925	38%	feasible	3,02	3,38	3,55	3,32
5	BAS	4854	8200	41%	feasible	3,08	3,38	3,42	3,29
6	BMC 2	7492	8250	9%	feasible	3,17	3,64	3,39	3,40
7	BPSCF	668	1800	63%	feasible	3,13	3,42	3,46	3,34
8	KUMNS	6060	8800	31%	feasible	3,06	3,44	3,51	3,34
9	GKRM	1797	3350	46%	feasible	2,45	3,46	3,39	3,10
10	GMBRIB	1509	5000	70%	feasible	3,1	3,59	3,4	3,36
11	GKMT	3925	10000	61%	feasible	3,13	3,28	3,46	3,29
12	LT A	20552	30400	32%	feasible	3,09	3,44	3,46	3,33
13	LT B	25465	42600	40%	feasible	3,12	3,56	3,38	3,35
14	GPS	16264	13000	-25%	Not feasible	3,19	3,45	3,47	3,37
15	GBB	1013	1250	19%	feasible	3,17	3,31	3,52	3,33
16	MNCT	38177	80000	52%	feasible	3,07	3,33	3,51	3,30
17	MAJO	56454	137500	59%	feasible	3,07	3,51	3,48	3,35

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18	MS C	11052	60000	82%	feasible	3,18	3,47	3,44	3,36
19	NAA	13475	121050	89%	feasible	3,21	3,52	3,54	3,42
Hotel									
1	CY MSB	10150	13000	22%	feasible	3,08	3,54	3,62	3,41
2	FWH	1356	555	-144%	Not feasible	2,65	3,45		3,05
3	HTB	4963	7250	32%	feasible	3,14	3,55	3,5	3,40
4	MidS	4800	3495	-37%	Not feasible	3,05	3,48	3,52	3,35
5	PWH	1617	4200	62%	feasible	3,11	3,53		3,32
6	SANBAL	16986	18840	10%	feasible	3,22	3,5	3,55	3,42
7	SANSAB	1995	2050	3%	feasible	3,22	3,41	3,44	3,36
8	LEGBAL	11635	1250	-831%	Not feasible	3,02	3,3		3,16
9	NEHOMA	5997	1650	-263%	Not feasible	2,86	3,38		3,12
10	NEHOSI	2973	1400	-112%	Not feasible	3,16	3,51		3,34
11	NEHOHAS	3897	1840	-112%	Not feasible	3,13	3,5		3,32
12	VILADE	5739	11105	48%	feasible	3,24	3,55	3,5	3,43
13	TALASU	3072	6500	53%	feasible	3,15	3,34	3,4	3,30
14	THEHE	3918	11500	66%	feasible	3,05	3,36	3,51	3,31

Table IV.2 Analysis of building defect findings on the type of work

Type of Building	Works		
	Structure	Finishing	MEP
Apartement	61066	96739	55429
Office	53245	74557	87114
Hotel	84857	116660	103610

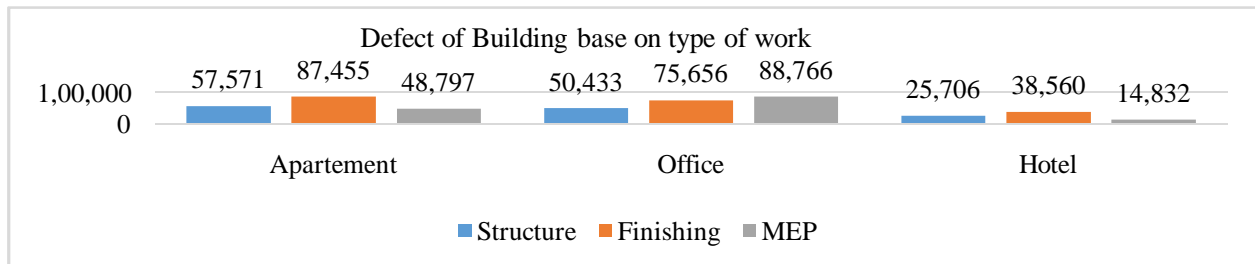
Data Source: Analysis results

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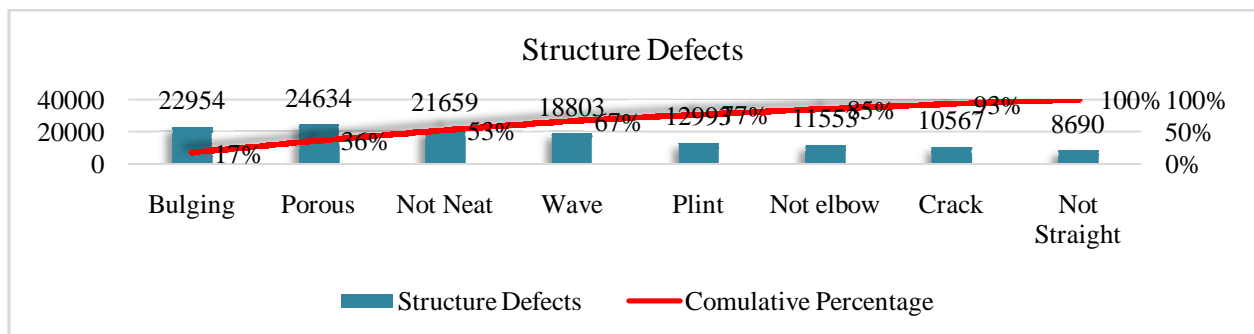
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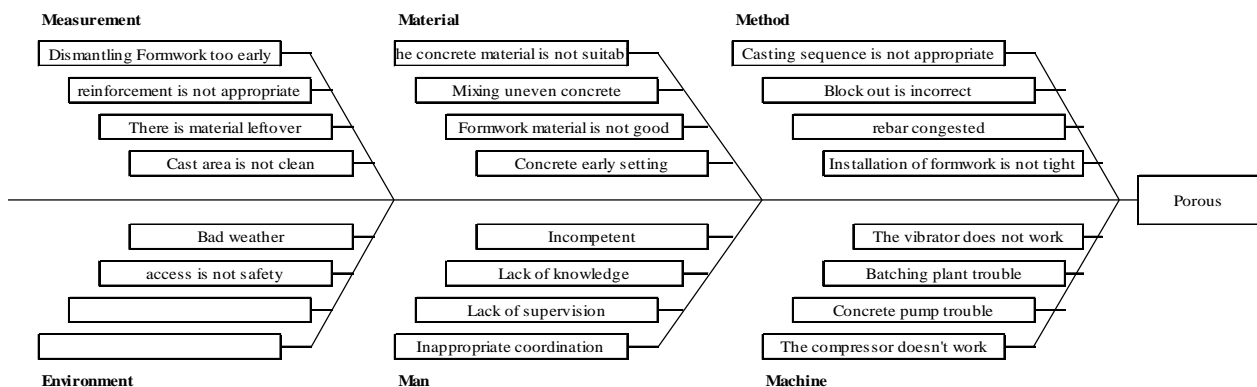


Grafik IV.1 Trend Defects based on the type of work

From graph IV.1, it can be seen that in apartment buildings and hotels the most defects are architect work because the details of finishing work are more complex and for office buildings, the most defects are in MEP work because in office buildings details and the need for MEP are more widely used. For structural work, during the construction process improvements have been made to each building in the hope that during the final inspection to defect structural work there will not be much defect found.



Graphic IV.2 Trend Defects structure work



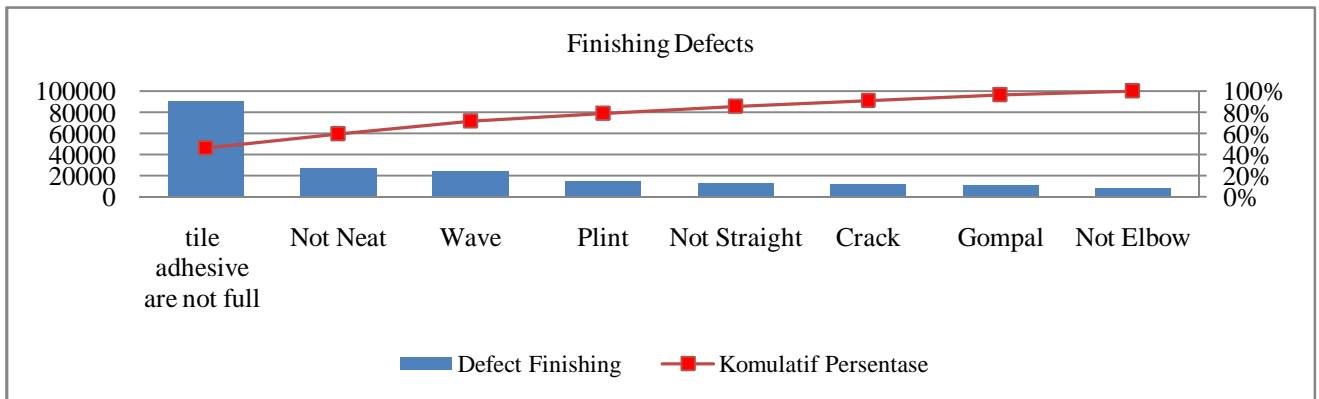
Picture 1. Fishbone analysis for defect structure work

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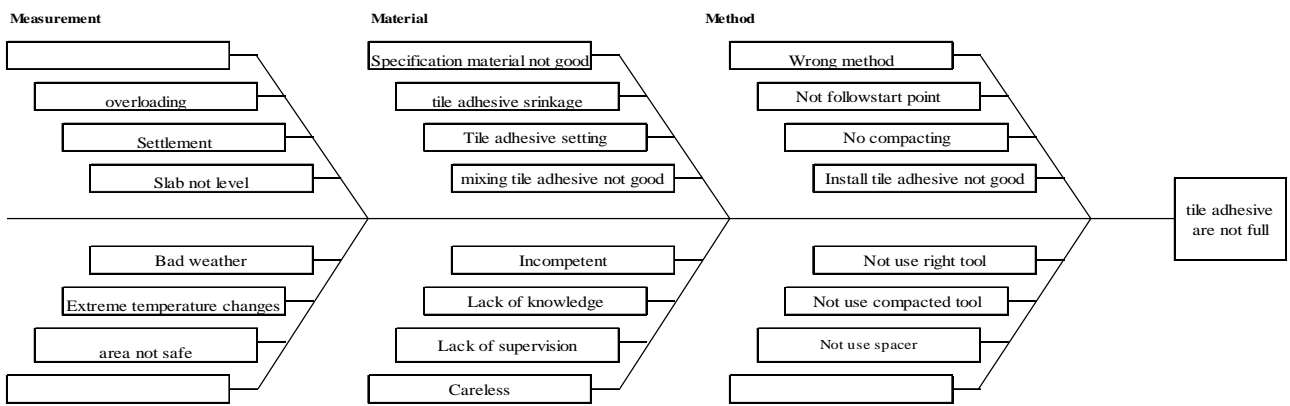
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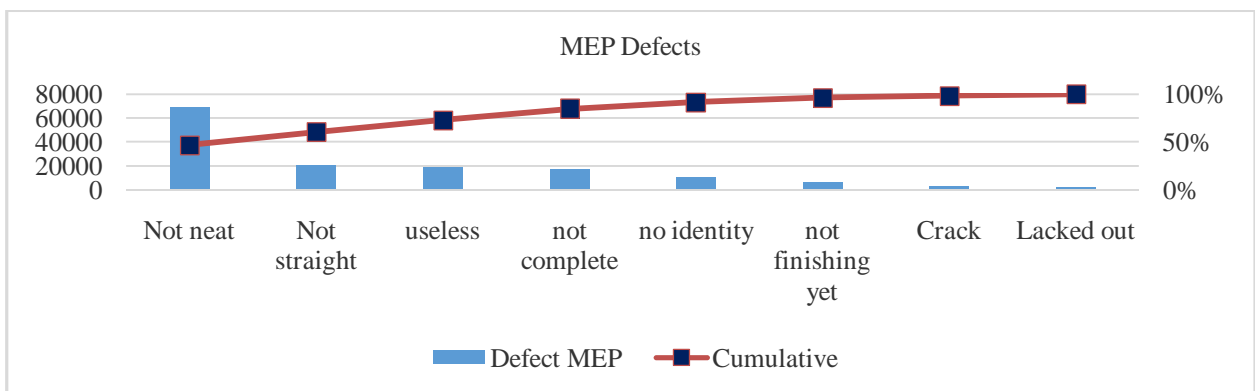
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Graphic IV.3 Trend Defects finishing work



Picture 2. Fishbone Analysis for finishing work



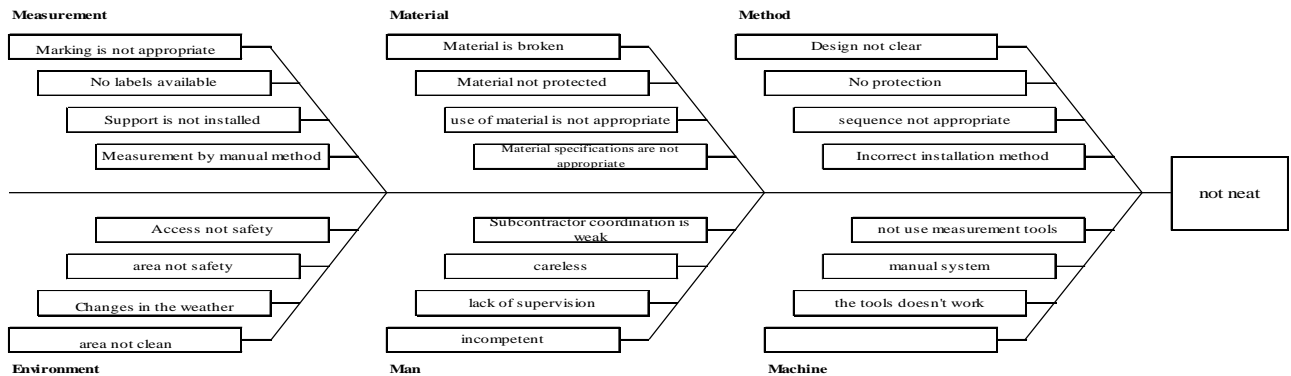
Graphic IV.4 Trend Defects MEP work

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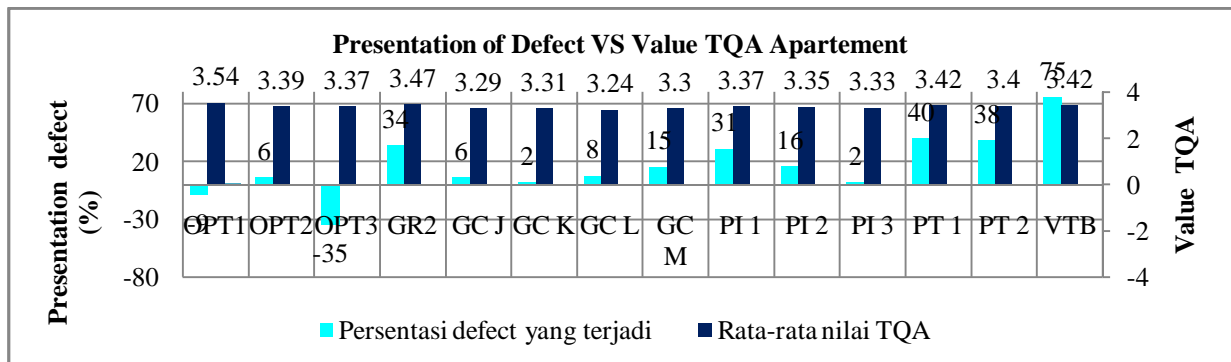
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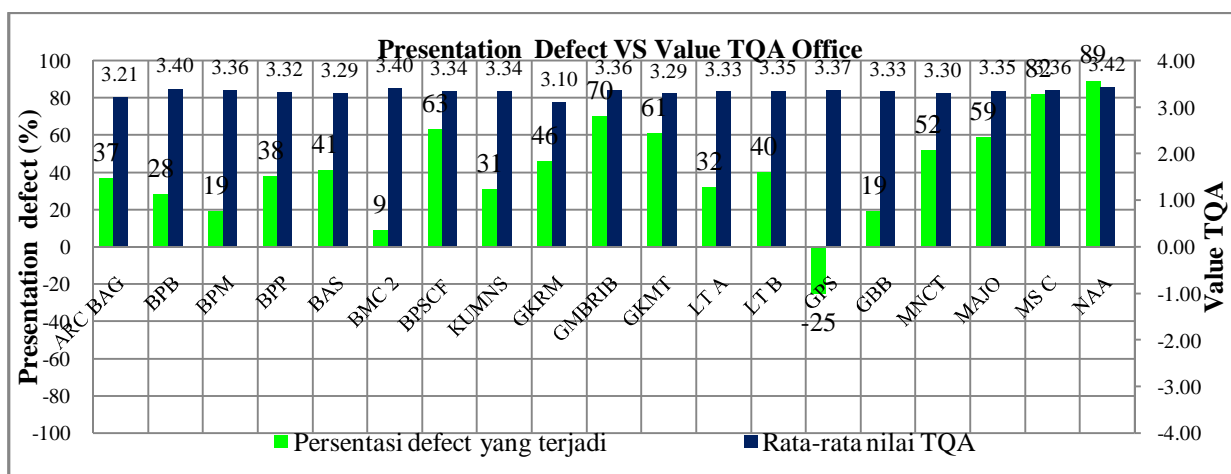


Picture 3. Fishbone Analysis for MEP work

2. Analysis of findings of defects on the value of Total Quality Assessment



Graphic IV.5 Presentation of Defect VS Value TQA Apartement



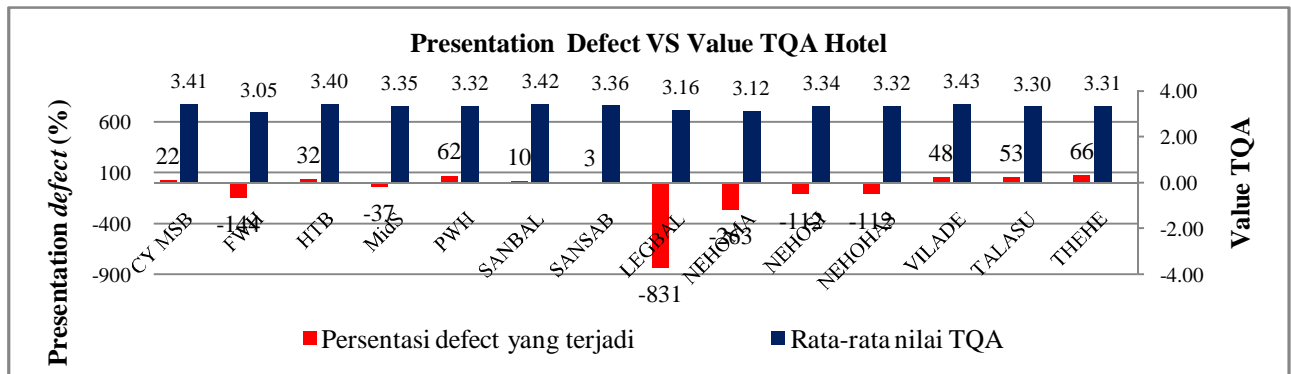
Graphic IV.6 Presentation of Defect VS Value TQA Office

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Graphic IV.7 Presentation of Defect VS Value TQA Office

V. CONCLUSION

- Based on the analysis of case defect findings in each work, it was seen that the most cases in structural work were porous concrete cases, the architect's work was found in cases of kopong ceramic pairs and in the MEP work found a neat case.
- Based on the description of the analysis above, it can be seen that the number of defect findings that exceed permitted defects needs to be repaired before being handed over to the owner. The percentage of projects that must be repaired before being handed over to the owner include:
 - Apartment = 14%; Office = 5%; Hotel = 43%
 In hotel buildings, reviews and quality standards for implementation in the field are more detailed so that findings can be reduced in future projects.
- The results of the analysis between the number of defect findings and the average TQA value found that the relationship between the two variables was very weak seen in the graph of each type of building, so the TQA value cannot be used as a predictor tool for finding defects at the end of the project handover.
- But from the results of the correlation analysis between the number of defect findings and contract values found between the two variables there is a strong relationship, so that the value of the existing contract affects the number of defects.

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