Software Design and Development for Optimizing Quality Assurance Assessments

Farid Sukmana, Fahrur Rozi

Abstract: Quality assurance (QA) in one part to assest standard quality in the management, product, environment or other. QA in organization controlled by QA staff. This staff work to prepare all requirement in process of internal audit . The requirement like making checklist from QA standard like ISO, OHSAS and others, arrangement scheduling for audit, until make summary from audit result is the job of them. The problem is all requirement to prepare internal audit still used manual job, like using excel and distributed it one by one to each section in organization. This is make waste of time just to prepare the requirement until to make summary of the audit result. So, how to reduce the time of the job QA staff from weekly to just a minute. This can do by implementing quality assurance using software. By implementing this system can reduce significantly, the step of work of QA assessment from 15 step, can be 5 step only. And some of work in QA assessment can be done just a minutes, that before need a day until weekly just to make the job done.

Keywords : Quality assurance, audit system, standard.

I. INTRODUCTION

Quality assurance in organization is used to control the management, product, environment and other. Now, QA has some standard that already arrange by the organization, some of them like the International Organization for Standardization (ISO), Occupational Health and Safety Assessment Series (OHSAS). ISO has many standard to assest some quality in organization like for security system (ISO 27001), environment (ISO 14001), management (ISO 9001) and others. This standard has many element to guide the auditor for assessment of standard quality in organization. But not all element is used by organization to assest the quality of them. QA staff usually arrange of some element that suitable with the condition of the organization. [1] Then using of the element of standard to make some question or checklist as material for auditor, so the auditor when try to give question to auditee will not out of box, and still based on the checklist. In the audit process, the auditor will be write four element of the finding based, there is Problem (P), Location (L), Objective (O) and Reference (R). PLOR is the standard template that be used auditor to fill the audit form and used by QA to get conclusion of the standard based on value of PLOR. [1] How to use PLOR in software as process assessment .

The problem from this process, many of QA staff still used manual method to manage audit process. Need to know about the manual method of audit process like still used the paper, manual distribution of the checklist or form to auditor, and long time for prepare and make summary from audit report by each section. With the old method, QA staff need a long day or weekly just for preparing the assessment process, and monthly for making summary from audit report. When the breakdown process of QA activity, the activity need a long time is the prepare audit like making checklist and distributed checklist for auditor in each section (without the cost of time when the wrong checklist), get the audit report from each auditor after the assessment finish, and to make summary from the assessment report. Another problem in out of assessment activity like lazy auditor send audit report, lost data audit report by QA staff is make the time of audit process more longer. Based on that statement, [4] indicate many of problem of assessment process related with transaction process from QA staff to auditor or otherwise. So how the process can be short, with just one minute or one hour to prepare checklist and get all audit report after the assessment finish, and all activity for QA staff like prepare summary already done in that time. Because [2][3][5][6] the good implementing of process in standard is how it can reduce defect during early process phases, reduce the cost and scheduling, installation and maintenance phases, and can strengthening the productivity and competitive for workers. So, with the efficiency process hope can satisfy the regulation by organizations.

Old method of assessment need change with modern method, like using information system for assessment quality assurances. [3][7][8][9][10] The software or information system used in many sector of industry for achieving competitive and effective process in all sector that difficult handle by people. So by using this method, hope can be short the time of the process from QA staff and auditor in the assessment and the working changed of this system like a robot. [11]-[14] The job that be handle by this system like prepare schedule until publish the schedule to each auditor as assessor and anothers job like prepare reporting, will be take by this system. So with this system will be short the step of working by QA staff to prepare audit and making report, and efficiency of time in working this job will be reduce significantly. [11][15][16] By using this system can be minimize the risk lossing data and less use paper. Based on that problem, this article will be show what activity that make a long time in assessment of standard, comparing between manual job and the system job. What step that need remove from manual methode when change to modern method.

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Because using software like decision support system can help technician to improve skill and productivity, so implement the assessment to software is needed to improve them. [21] Another thing, how make design the system of this problem using software for assessment process. But this need controlling with another international standard about IT service Management to know this software ready has the requirement. Our focus in this study just design system without considering the IT service Management.

II. METHODOLOGY

In this section, showing about differences of manual system and modern system using software in assessment process. The chart of this two method can look at figure 1 and figure 2. Figure 1 show about the process of manual system when many of the job is still handle by QA staff, and figure 2 show about the some job that be handle by QA staff already changed by the automatic system.

A. Prepare Master Checklist

Master checklist in this study prepared by QA staff to determine what standard that be need implementing in the organization and what question can be used in assessment process based on the element of standard. The difference things in old technic and new technic is a process when the collect data and prepare the master of checklist. Look at table 1, the example of standard and the checklist for both of technic.

<table>
<thead>
<tr>
<th>No</th>
<th>Standard</th>
<th>Element</th>
<th>Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ISO 14001:2015</td>
<td>4.2 Nonconformity and Corrective Action</td>
<td>1. Does the organization determine the interested parties that are relevant to the EMS? 2. Does the organization determine the requirements of these interested parties?</td>
</tr>
<tr>
<td>2</td>
<td>ISO 14001:2016</td>
<td>5.3 Organizational roles, responsibilities and authorities</td>
<td>1. Does top management ensure that the roles and their relevant responsibilities and authorities are assigned and communicated within the organization to ensure that; a) EMS conforms to the requirements of the ISO14001:2015 standard? b) Performance of the EMS, including environmental performance, is reported to top management?</td>
</tr>
</tbody>
</table>

Generally, table 1 has four step of the job of QA staff to prepare master checklist. There are, determine what standard will be used, what element of standard that suitable with organization, what question must be arranged based on element, and how to distributed master checklist in each auditor. Need to know, master checklist used in a long term activity in assessment schedule. The meaning of this, the checklist of the element in each standard do not be changed in a short time or can be used for a long time by organization as a standard in they organization. In the figure 1 and figure 2, master checklist prepared by QA staff, the differences of this step, for figure 1 all data save in excell program, and figure 2 used mysql and application interface to modify data.

Flowchart from figure 3 is the general process preparing checklist before distributing to auditor. The important thing in this part, the checklist is ready to use and no modification again after publish to each assessor. The advantages using automatic system, when the form of checklist any modification, they only delete schedule data and create a new schedule data to distribute this form.
Difference by using manual checklist, QA staff need to pull of them from auditor one by one, and this is waste time for QA staff.

B. Distribute Checklist Form

After checklist form ready to distribute, the next step is making schedule for assessor. The schedule consist of the time of auditor to assess the some section, the member of auditor, checklist form that be used by assessor, and the auditee target. When schedule ready prepare, then all information publish to all assessor, so they now what the job they will be do in the assessment process. Look in figure 1, the job that be handle by QA staff about four step that they must do in manual system. Among of them like, create audit number, create schedule, create checklist and publish schedule to auditor using manual job like email or another facilities, and all of this job handle by QA staff. Difference with figure 2, in this graph show the QA staff only create audit number, then all job like scheduling, create checklist form, and distribute schedule handle by system.

![Figure 4. Use case manual and automatic in assessment process](image)

In the previous section, many explanation about the design system of assessment process and the illustration how the system working, use manual and automatic job. In this section of study, present the impact of the automatic job in assessment process, comparing with the manual job. What significant process that make the automatic job is more powerfull, efficient than manual job, how much time the QA staff can be reduce they activity to prepare until finishing assessment process. Based on the previous statement and explanation, many advantages will be give the automatic system than manual system. But still do not show the part of process that reduce activity and the time in that explanation. Table II present the differences function for manual and automatic system. What function that available in manual and unavailable in the automatic, and what step that be reduce in automatic system, so more simplify than manual job in assessment process.

![Figure 5. Collecting audit report](image)

In the figure 5 show about the process of collecting audit report using manual and automatic system. The manual system when look at in figure 5, the transaction process from auditor to QA staff involving request-answer process. Or can be said, to transfer data of audit report need waiting the job of auditor done in assessment process, otherwise for auditor to get the summary audit result need waiting the job of QA staff done to collect all audit report data from all assessor. Difference with automatic system, request-answer removed from this process. The auditor and QA staff can get the audit report and summary in that time without waiting each other, because all data can be direct access to server. And modification to the PLOR by auditor, make direct change to summary for QA staff.

III. RESULT AND DISCUSSION

In the previous section, many explanation about the design system of assessment process and the illustration how the system working, use manual and automatic job. In this section of study, present the impact of the automatic job in assessment process, comparing with the manual job. What significant process that make the automatic job is more powerfull, efficient than manual job, how much time the QA staff can be reduce they activity to prepare until finishing assessment process. Based on the previous statement and explanation, many advantages will be give the automatic system than manual system. But still do not show the part of process that reduce activity and the time in that explanation. Table II present the differences function for manual and automatic system. What function that available in manual and unavailable in the automatic, and what step that be reduce in automatic system, so more simplify than manual job in assessment process.
Table-II. Differences Function of Manual and Automatic System

<table>
<thead>
<tr>
<th>No</th>
<th>Function</th>
<th>Manual</th>
<th>Auto</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Y/N Step</td>
<td>Y/N Step</td>
</tr>
<tr>
<td>1</td>
<td>Create element based on standard</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2</td>
<td>Create master list for each section</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>3</td>
<td>Create audit number</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>4</td>
<td>Create audit schedule</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>5</td>
<td>Prepare checklist form for each section</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>6</td>
<td>Publish checklist form to each section</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>7</td>
<td>Fill data of checklist form</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>8</td>
<td>Send audit result to QA staff</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Who is create PLOR</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Who is modified PLOR</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Date modified</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>9</td>
<td>Collect all audit result from auditor</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>10</td>
<td>Preprocessing to make summary of report</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Collect all finding data</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Grouping finding based on PLOR</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>11</td>
<td>Summary of audit result</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Report by Finding</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Report by Cluster</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Report by Category</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Report by Category based on graph</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

Table-II show about the differences job of manual and automatic assessment process. Observe the step of job the both of them, automatic system has less step to work from scheduling until provide the summary of audit report. Comparasion both of them just for step of job is 3:1. By using automatic to finish the assessment just need 5 step, and using manual need the step of job is 15 step. This is reduce significantly and make efficiency man power. And the output result of audit, sure can be accurate than still using manual system.

Presentation from table-II can be descripted one by one about what the job that need a long time to finish the function. First, look at function number 1 and 2 about create element and master list of standard, the both of them hold by QA staff, the preparing process is same, the difference thing just in storage media. Because that, each function on that point have one step for manual and automatic process by handle QA staff. Second thing is what the step 3 in automatic assessment and look at point 3 until 6, the function was working parallel in the automatic assessment, for manual is more complex just do finish this function using sequential job. Especially for the point 4-6 need a long time just for prepare until distributed. When review that function, the complexity of time need about 1 day. But using automatic process, by created the schedule then all job 4-6 finished in that time, need less than 1 minutes. Look at figure 5 about the complexity time of the job on each function from step 3 until 4, the cost of time to use it not more than 11 minutes, comparing using manual system that need time about 16.5 hours. The significant time in this step because some step in automatic process can do with parallel job.

Figure 5. Complexity time of function (1-6)

Next, about the point 7-9, this function has special explanation in this section because on that point one another function has relation or can be ask this job function is one combination, or need to be done in that time. Look at table II in the manual system, the job like fill checklist form by auditor then send and collect audit report still available in the process assessment. Different when using automatic system, the function still exist on that point is 7, and point 8, 9 remove from the job of auditor and QA staff because this function already done in that time by this system, or can be ask this function was not need by automatic system. Just open this system by the QA staff and auditor, then can look automatic service of audit report in that time, without waiting one another. Another things by using auto system, QA staff can traced the status of audit report that already fill by assessor in that time like the name of QA staff created the schedule, the name of auditor that fill the form, and last modified date in audit report.

Figure 6. Complexity time of function (7-9)

The hight cost of time in the job function is fill checklists form, because this activity is audit assessment using PLOR to assest the standard in the part organization. So this process need a long time from to start to finish, and this activity need approximate time more than 2 days (8 hours/day) until the job done. The both system, has same time just for this activity. But in the next activity auto system do not need again the activity like send and collect audit report. This is only did by manual system, and they need approximate time to finish the job about 1 days/activity. So, just with 1 activity with auto system can be handle 3 activity in the manual system, and save of cost time to work until 2 days.

Next is point 10-11 in the table II, show two parent of job that consist of child job.
Preprocessing is function or job that do by QA staff to arrange the audit result based on element of standard in assessment procedure and then use it for next function to make summary report as requirement in organization. In the preprocessing step when using manual system, QA staff need to handle two job based on document, there are like collect all data from auditor and then grouping the each element of standard based on POLOR. And this work only do with sequential job. But in the auto system all of this job was eliminated or remove from the process to get summary of assessment. The other different things when make summary report , this job available in manual or auto system, but the job in the manual system working sequentially to finish every summary report. Look at table-II, there are 4 kind of summary report like report by finding, cluster, category, and category based on graph. Then in the auto system all of that job can be run in parallel.

Figure 7. Complexity time of function (9-11)

Figure 7 prove the efficiency of auto system that reduce the waste time in the job process assessment. By using the manual the job done about 3 days (8 working hour/day). But when using the auto system only need 1 minutes to get all of job in the step 10-11 done. Based on explanation in the above statement was proved the process when using auto system in assessment more efficient, faster then accurate. The efficiency like the step of work can reduce from 15 step, now only 5 step. And requirement of the maximum time with manual system about 10 days (8 working hours/day), but when auto system are running, the cost time only 3 days (8 working hours/day).

IV. CONCLUSION

The assessment standard using manual system and automatic system has the same result when the job done in assessment process. But they has big difference for effectiveness in the cost of time to work and step to work from begin until the end of the assessment. The manual processing still used the old technique to prepare, audit process, and summary data. This process need many step to work just to execution the job. To prepare the audit process, the step to complete it about 6 step, different with auto system that only need 3 step until the audit process. In the audit process, the first technique need 4 step to finish this process, but when use the auto system only need 1 step and the job done. And the last job to get the summary the old technique need 6 step than new technique using software that only need 1 step. Based on this study, show the assessment software is very needed for organization in the management to make efficiency job and maximize productivity for QA staff or auditor. With this software, the job that still done in sequential process can be change in parallel job to complete the task. But this study need to observe again about impact the software to improvement of skill the auditor .

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