
# Building a Foundation for Maintenance & Reliability "Best Practice" Work Processes in EAM

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## Introduction

Today many companies are pursuing improvements in their maintenance and reliability programs. These improvements are approached in many different ways. However, the most overlooked opportunity for improvement comes with the implementation of an Enterprise Asset Management (EAM) system. We must remember that EAM is a tool and the success of the implementation is dependent on maintenance work processes that utilize this tool. In many companies the EAM implementation effort is initiated and lead by IT departments with little or no help from the maintenance department. The maintenance department, in addition to being the end user of the system, should have the responsibility to participate in the selection and especially the implementation. The foundation for the "Best Practice" work processes is the basic work processes consisting of **I**dentification, **P**lanning, **S**cheduling, **E**xecuting and **D**ocumenting work, or IPSED.

## EAM Implementation or Improvement: An Opportunity

For the purposes of this paper EAM and Computerized Maintenance Management Systems (CMMS) shall have the same requirements and reference, although I will be referring to EAM in the text. Most initial EAM implementations will involve either less than 25% usage of the software capabilities or an attempt at 99%. Neither is the correct approach for initial implementation. The most effective methodology is a plan based on assessment and immediate business requirements. Long range business plans as well as reliability technology improvement support requirements are better scheduled during an improvement phase scheduled after the initial implementation and a pilot period. This can also be referred to as "Eating the elephant one bite at a time", and EAM systems are elephants.

Let's examine the basic differences between EAM and CMMS. CMMS is primarily a maintenance tool for producing work orders, tracking performance, providing parts and storing the history for assets. EAM is that and much more. EAM has tentacles reaching out to the business of the organization including purchasing, financial, human resources, payroll, production processes and projects. Therefore an attempt to implement 99% of the EAM capabilities initially can set you up for failure in the short term. Remember that any improvement or implementation of any system or program is a major change to the culture of the organization and with change "slow is fast".

However, one of the first changes that should be made is to the foundation of maintenance – Basic Work Processes. This is IPSED. No matter how good the organization feels about the

present basic work processes, there is always room for improvement and an EAM implementation or improvement project is the perfect stage. Just changing software alone will require some change in the manner maintenance is managed. Why not use this opportunity to use a best practice approach to improvement?

*"There is no one size fits all maintenance program"*

Best practice recommendations are used to help provide a framework from which you can build upon. There is no cookie cutter approach to maintenance improvement and every organization will present its own set of problems and solutions.

## Basic Work Processes: What are they?

Basic work processes are the framework that you use to manage maintenance. They are all equally important and actually complement each other in the work management process. Sometimes referred to as workflows, basic work processes should be documented, agreed to and understood by all those involved with work management. In addition to the workflows themselves, we must also concern ourselves with work order codes that are used with the processes. Some of the basic work processes will seem very straight forward and almost common sense based. In many cases they are, but let us look at what they really mean and determine whether your organization has established this maintenance foundation and is really using it. Figure 1 shows the basic flow.

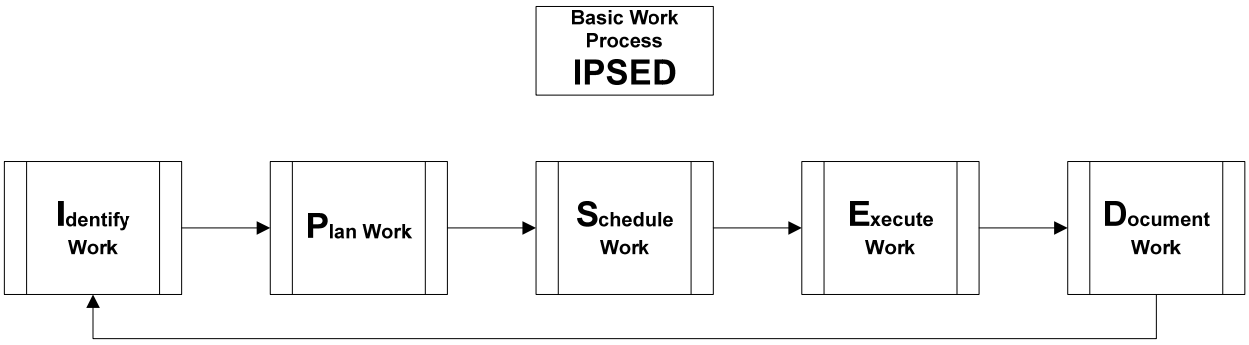


**Figure 1**

## Identify Work

Let's look at the first part of the process: Identifying Work. Work can be identified in many ways. Originally, identification of work was with failures of equipment, but today that should be only 5% or less of the total workload. Today, Preventive Maintenance (PM) inspections and Predictive Maintenance (PdM) technologies are the principal means for identifying work, and best practice suggests this should be 85% of the total work load. This 85% consists of the inspections, technologies and the repair work that is identified. We also have the work requests that come from production, management and others making up 10%, leaving 5% for emergency work. This assumes the organization has a proactive maintenance environment.

When an organization embarks on an implementation or improvement, one of the first work order codes to define to support Identifying work is **PRIORITY.** This is probably the most abused work order code because it is rarely defined. Oh yes, it may have time frames associated with it such as complete within 24 hours, 3 days, 7 days etc.- but is it defined when to use it? For example: 1 or High can mean complete within 24 hours and is used for immediate threats to safety, environment, production or quality. This way everyone in the organization is using the codes in the same manner. Of course, a gatekeeper such as the planner needs to monitor the use and change the code when necessary.

One of the mistakes made when looking at identifying work is the concentration on how emergency work is communicated. As a consultant I have seen time and time again the discussions become intense around how to get emergency work into the work order system. Why spend so much time on something that should only be 5% of your workload? Granted, in the beginning of any sort of improvement, the figure is going to be higher, but even at 20-25% the discussion can be shortened. Emergency work in reality should be accomplished and then a work order completed after the fact. Phone, urgent E-mail or even text messaging can communicate the need. Less urgent work should be requested with the use of a work request or notification depending on the software. This allows control of the work order process. The policy of allowing everyone to create work orders is more chaotic and it does not take long to lose control of your work order process.

In addition to priority, other codes such as failure cause, work type (request or work order), and a detailed description of the problem are also required. I wish I had a nickel for every work request or work order with a description of broken, damaged, fix pump and other vague text that I have seen. The time taken to write a better description and adding the proper codes can save a lot of planning time that allows the planner to focus on the planning rather than tracking people down to decipher work requests.

Most EAM systems have an approval process for work requests and even work orders. The approval of work requests is based on the type of work and perhaps more importantly the work priority. This also allows a process for the planner to schedule the planning workload based on priority. The approvers will vary from one organization to another and usually consist of production supervisors/managers, maintenance supervisors/managers or even work leaders and planners. The size of the organization and business practices will dictate this assignment. Figure 2 illustrates the basic components of identifying work.

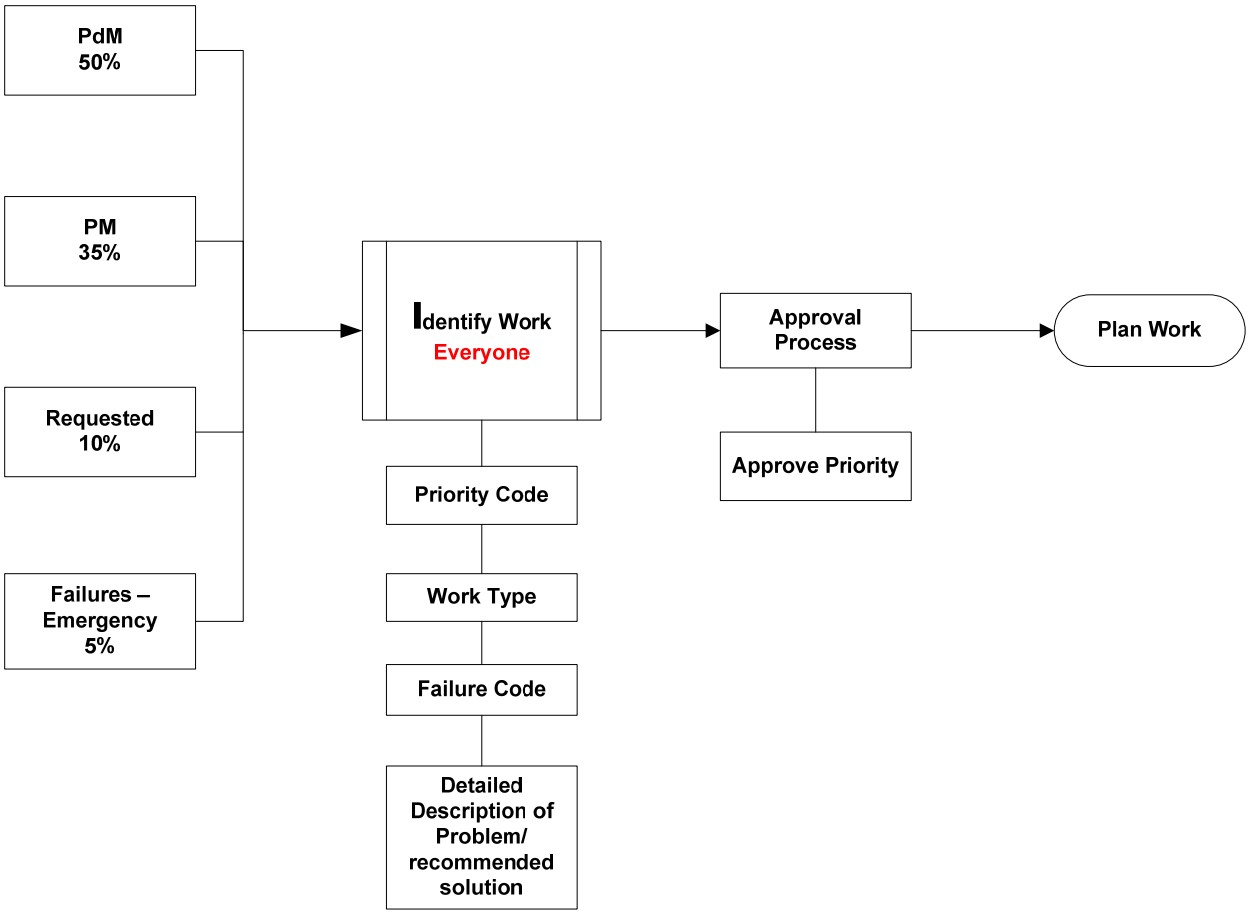


**Figure 2**

## Plan Work

*Failing to Plan is Planning to Fail!*

About three-quarters of the organizations I have worked with have a planner position in place. However, only about a quarter actually utilized the planner to actually plan work. I have observed planners acting as coordinators, supervisors, technical go-to people and other roles. The Planner in many organizations is probably the most abused position in the maintenance department. This is not the Planner's fault, just a lack of actually knowing what a Planner's real job is. First, many medium to large organizations only have a single planner and no scheduler. This usually results in an overworked, demoralized and frustrated person. Add the daily interruptions from crafts, supervisors and production people and you have almost no planning effort being realized. The preferred ratio of crafts to planner based on best practices is 10-15:1.

Let's discuss the planning function first. Planning is the definition of parts, crafts, outside contractors, permits, procedures, technical references and QA requirements for a work order package. This function requires an individual who is experienced with the assets and maintenance procedures required, including corrective, PM and PdM. The Planner is usually a very talented, experienced and knowledgeable individual. That is the trap. Armed with good intentions and no formal training in planning and scheduling, the new Planner goes forth to conquer the world. Soon, crafts are requesting parts, production is calling with problems and the maintenance manager is asking for the status on work being done. None of these items should be a part of the Planner's day. A Planner should be concerned with work to be scheduled out one week and beyond. Supervisors and coordinators are responsible for what is happening today. In addition, planners tend to become the EAM administrator, spending most of the day doing data input. Whenever an organization is implementing a Planner an investment in training is required.

Backlog management comes into play during this work process and the pendulum can swing both ways when it comes to "too much or not enough". A rule of thumb is to have about 3-4 weeks worth of work in backlog. This allows the scheduler enough time to correctly schedule resources in advance. In most cases a little too much is better than not enough. If your backlog is a week or less, it is an indication that your work identifying process may need some attention. Remember to use the priority codes properly in order to aid in planning and scheduling. Not everything is an emergency or even urgent! Periodic backlog management meetings are used to determine if the work is still required or priorities need to be changed.

The purpose of having a planner is to allow the crafts to spend more time actually doing work instead of work preparation. Figure 3 illustrates some of the differences between unplanned and planned work.

| Event | Unplanned | Planned |
|---|---|---|
| Instructions | 5% | 3% |
| Tools & Materials | 12% | 5% |
| Travel to and from Job | 15% | 10% |
| Coordination Delays | 8% | 3% |
| Idle at Job Site | 5% | 2% |
| Late Starts and Early Quits | 5% | 1% |
| Authorized Breaks | 10% | 10% |
| Excess Personal Time | 5% | 1% |
| Subtotal | 65% | 35% |
| **Direct Work Accomplished** | **35%** | **65%** |

**Figure 3**

*Nyman & Levitt, 2001*

In some smaller organizations the planner is also the scheduler. However, planning and scheduling are two different functions. Planning is the what, why and how, while scheduling is the when. Planners normally utilize a checklist of requirements for a job, including procedures, resources, permits etc. A site visit is sometimes required when there is not enough detail on the work request or it is a large task. Estimates for labor are developed and material/special equipment costs are also captured with the work order. It is not good practice to avoid estimating work on work orders. This information is imperative for both budget and scheduling requirements. Estimating is not always easy and may require discussions with supervisors and crafts personnel. Routine work can be saved as job plans in the EAM system. Most organizations have a maintenance administrator to do data input in the EAM system. This leaves the planner enough time to do the real planning. These administrators are normally responsible for generating or triggering PM work orders unless the system is configured to do this automatically. They are also sometimes tasked with timekeeping and putting work packages

together. The scheduler then schedules the work. Figure 4 illustrates a simple workflow for planning work.

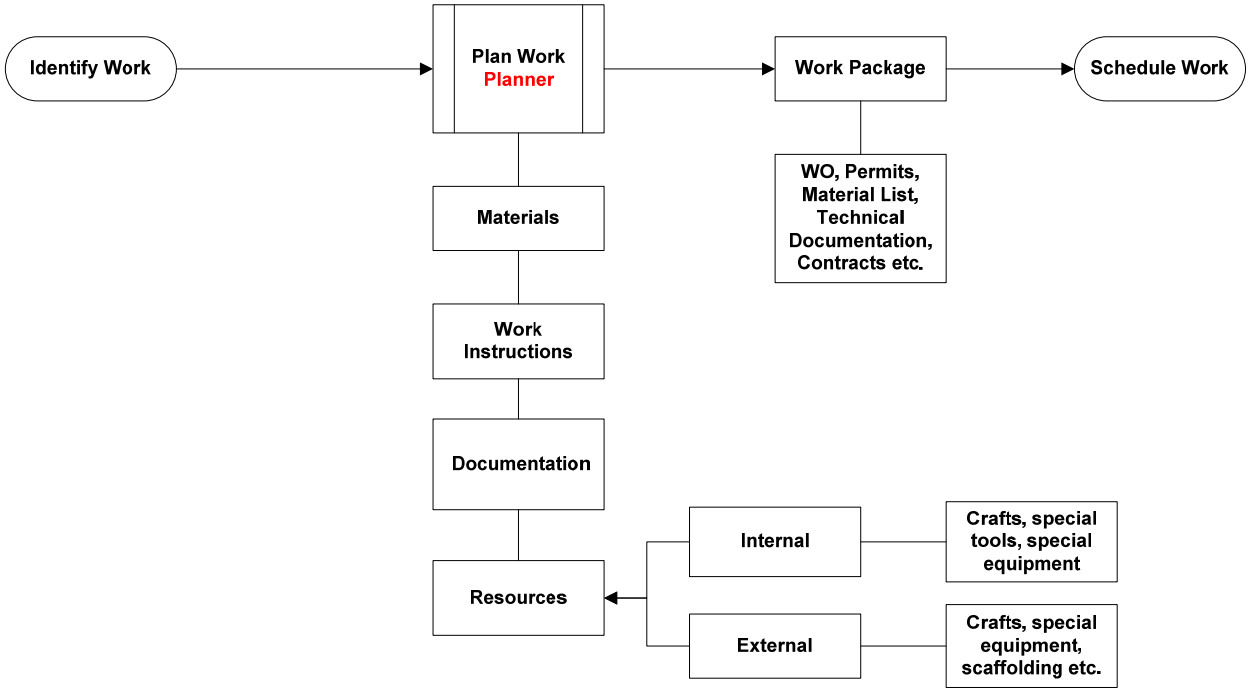


**Figure 4**

## Schedule Work

Whether your organization has a scheduler or the planner does the function, scheduling is a separate function from planning. After the work order is planned, the scheduler will determine the availability of material, internal and external resources and the asset to be worked on. The availability of the asset is normally determined through the use of planning and scheduling meetings. While the primary purpose of these meetings is to schedule work, the planner also attends in case the scope of work needs to be changed or other questions come up. The other attendees include representatives from maintenance, production and management.

Most EAM systems have scheduling capability, although limited in some cases. Schedules can also be prepared in Excel or Project depending on the size of the organization and software capabilities. In addition, there are Application Program Interfaces (API) available for bilateral data transfer between scheduling tools and EAM software. Normal short-term schedules are 3-4 weeks out while long term scheduling can go out several months or even years in reliability mature organizations. The longer term scheduling is normally required for turnaround type

maintenance and is accomplished annually. This long term scheduling can also assist with determining future budget requirements. Weekly schedules are developed and provided to supervisors, normally on the Thursday or Friday of the week prior. Figure 5 illustrates a basic scheduling workflow.

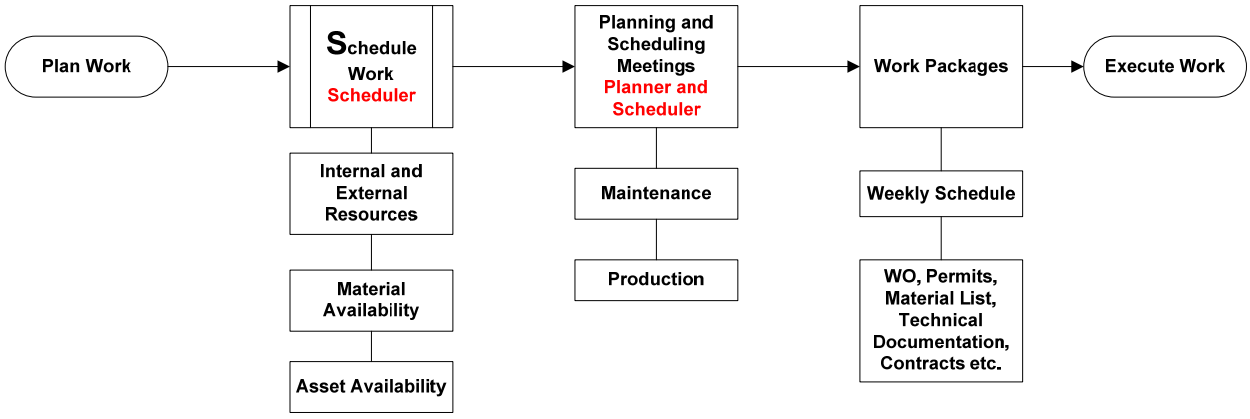


**Figure 5**

## Execute Work

Once work is on the weekly schedule there are several things that take place. The storeroom personnel normally prepare a kit consisting of the work package and parts. This effort is called kitting and saves the crafts time in job preparation. The supervisor prepares daily work schedules and assigns work orders to the crew by name. This can be accomplished with the use of custom reports from the EAM system or with scheduling software. As we do not live in a perfect world, sometimes the work package may be missing some of the parts or information required. In addition, when the asset is worked on there may be additional work required. This requires a judgment call. If the work scope completely changes and the asset can be rescheduled, the work package can be returned to the planner with the information on the work order for the growth in scope and the kit is returned to the storeroom. If the work only requires some additional parts, references or time to complete the job, the craftsman or technician should consult with the supervisor and the supervisor will obtain the additional items. Under no circumstances should the planner be bothered with providing additional parts or references except in rare special circumstances. Remember the planner is concerned with future work, not what is happening today. This is one of the hardest things for the work force to understand and practice, but they must be disciplined in order for the process to work.

If the task being completed is PM or PdM and additional work is discovered, this will normally be documented on a work request and sent through the approval process. If the work is of an urgent or emergency nature, a phone call is made to the planner and a work order will be generated or, in those very rare times when a break in schedule is required and the work must be done to avoid catastrophe, the applicable supervisor or work coordinator is notified.

Once the job is complete and the quality assurance requirements are met, if required, the craftsman or technician will notify the supervisor and if required, the supervisor will inspect the job. The next step is to document the work. Figure 6 depicts a workflow for executing work.

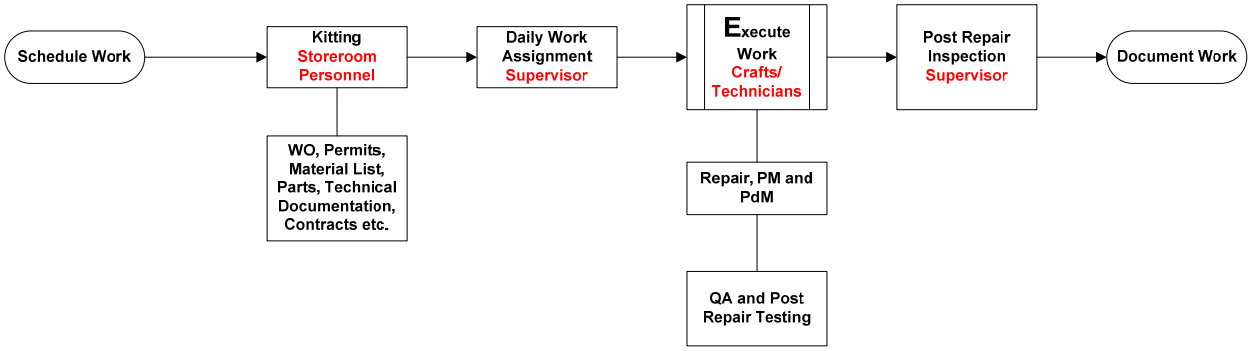


**Figure 6**

## Document Work

Other than planning, I feel this is the most important basic work process. Many organizations fail to realize the importance of documentation until they decide to use some of the history in the EAM system. Remember the old phrase “garbage in, garbage out”. If good work data is not entered into the system it can affect the whole history of an asset. This usually comes to light when performing a failure analysis. Root Cause Analysis (RCA) requires facts, and facts usually come from documented data. Work order history is usually the primary source for these facts.

Upon completion of the quality assurance requirements and the supervisor’s inspection of the completed job, the craftsman or technician will complete the work order. This includes text and checking the applicable codes, which can include failure information if applicable, reason, source and others depending on the EAM system used. Most EAM systems allow the use of some type of completion or quality checklist, and in some cases additional fields may be added to work orders. The important thing to remember is to be complete and accurate. The work order

is then sent to the supervisor for review. If the work order is completed electronically, which is preferred, the supervisor may have to be notified to review the documentation depending on the EAM system. The supervisor will review the documentation for completeness and accuracy then forward it to or notify the planner, whichever is applicable.

If additional work was discovered during the execution process, a work request is normally completed and forwarded for approval as described in the Execute Work process.

It is imperative that work orders are completed with as much information as possible. Examples of this information may include:

- Additional parts required
- Procedure changes
- Failure data
- Additional special tools
- Digital pictures
- Additional work
- QA results
- Man hours and resource types

The planner reviews the completed work order and documentation. In some cases a standard job plan is created in the EAM system if the work may need to be accomplished again. This is invaluable as the completed estimates, procedures identified and parts requirements are known. This is also a good time to update current procedures and the Bill of Materials (BOM) as well. If the work order contains changes in PM or PdM or failure information, the Reliability Engineer should be notified to review the work order as well. The Reliability Engineer will assist the planner with updates to PM or PdM and utilize the failure data for RCA if required. Figure 7 illustrates the work flow for the Documenting Work Process.

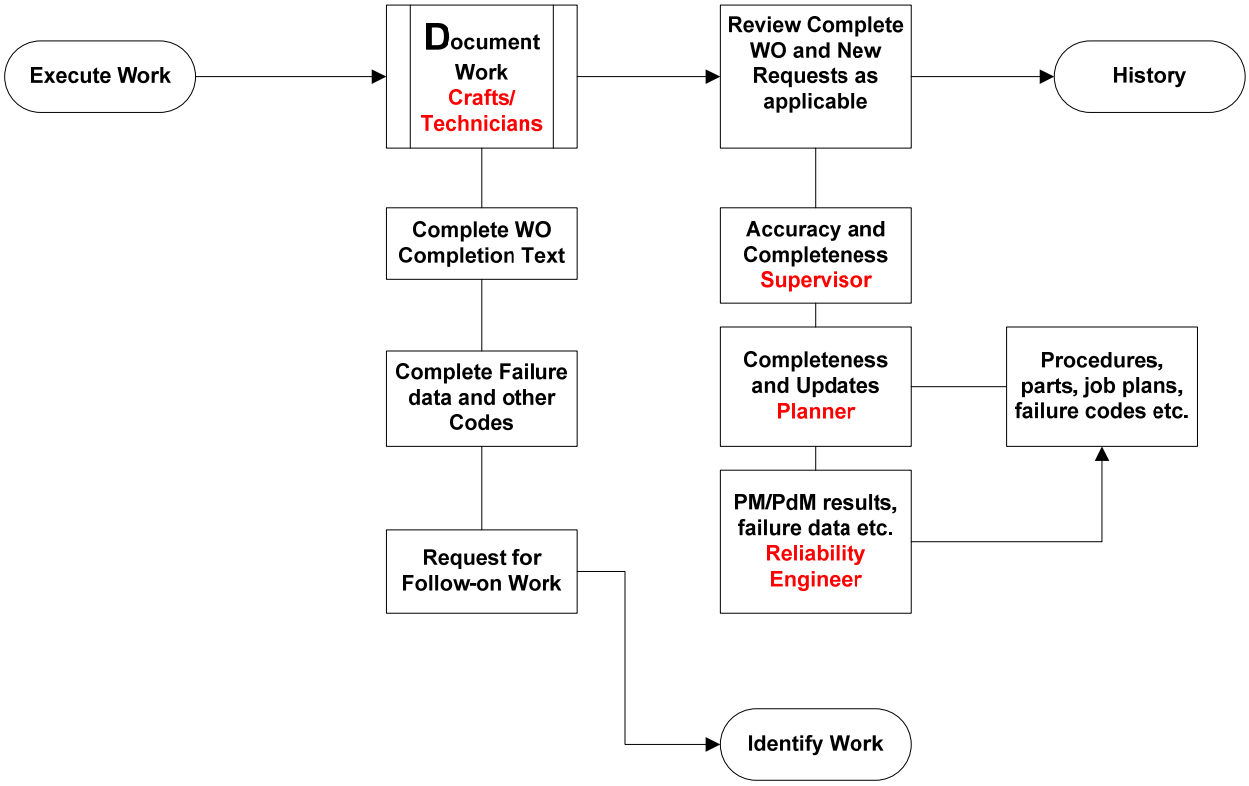


**Figure 7**

## Conclusion

Basic Work Processes should be reviewed each year and updated when required. Maintenance and reliability practices and technology undergoes continuous change and improvement. We must always be proactive and continuously strive to improve everything we do both at home and in work. IPSED is the foundation for all your maintenance processes and offers the opportunity to make improvements with very low cost outlay. This is all about the change in culture to a proactive culture which will reward all levels of an organization both tangible and intangible.

## About The Signum Group LLC

Founded in 1994, Signum Group is a leading enterprise asset management consulting and systems integration company.

Signum's team of senior asset management consultants has delivered over 100 projects to over 30 Oracle customers across a wide range of maintenance-intensive industries.

Signum customer support incorporates **SignumWay™**, a suite of proprietary implementation, data management, and training toolkits that combine the benefits of streamlined software implementation with a business process management approach.

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