

## DEFINITION

Asset MRO bills of materials (BOM) are lists of equipment spare parts. They are sometimes called Equipment Spare Parts Lists.

The term BOM is used to refer to several different types of parts lists. Some list the parts that comprise a piece of equipment; others list the parts that facilitate proper maintenance of a piece of equipment. The following are some of the most common:

- **OEM BOM:** An original equipment manufacturer (OEM) BOM is a complete list of all components and subassemblies used by the original equipment manufacturer to build a piece of equipment.
- **Work Order BOM:** A work order BOM is a list of materials required to accomplish the work described in a Work Plan. These materials are normally assigned to repetitive or rebuild work procedures.
- **Asset MRO BOM:** An asset MRO BOM (also called equipment BOM, maintenance BOM, or MRO BOM) is a list of materials needed to maintain a specific piece or class of equipment. An asset MRO BOM can contain both stock materials (from the Materials Catalog) and non-stock materials.

*Note: This practice focuses on asset MRO BOM, henceforth referred to simply as BOM.*

## PURPOSE

The purpose of BOM practice is to establish a process for developing and maintaining complete and accurate BOM for all facility equipment. Materials planning processes such as store-stocking and critical spare identification require complete, accurate, and up-to-date BOM in order to function effectively.

## Benefits of BOM

The benefits of maintaining complete and accurate BOM can be significant; some are listed below.

- **Improved Part Identification:** BOM allow Maintenance personnel (Planners, Supervisors, and Technicians) to quickly and accurately identify required parts for scheduled and unscheduled work orders. Consider the difference between searching a BOM (containing perhaps a few dozen parts) and searching the entire Materials Catalog (containing tens of thousands of parts).
- **Improved Maintenance and Storeroom Efficiency:** Accurate parts identification on work orders leads to accurate storeroom pick tickets, which improves the overall efficiency of both Maintenance and Materials Management. For example, if an incorrect part is planned on a work order, the Maintenance Technician working the job will have to fill out a Material Return Tag for the incorrect part and generate a reservation for the correct part. Materials Management personnel will also have to process both additional transactions.

As another example, suppose there are three different items in the Materials Catalog that have very similar or identical descriptions. If there is no BOM, a Maintenance Technician working on an Emergency work order might request one of each item and return the two unused ones to the storeroom when the job is complete. This example is inefficient for both Maintenance and Materials Management.

- **Downtime Reduction and Avoidance:** BOM facilitate the critical spare identification process and speed up identification of required spare parts, thus reducing mean time to repair.
- **Increased Maintenance and Storeroom Labor Productivity:** BOM decrease labor time spent scoping, estimating, sourcing, reserving, and requisitioning spare parts.
- **Inventory Reduction:** BOM help identify obsolete materials, eliminate duplicate spare parts, and can suggest minimum stocking levels by establishing the potential need for each spare part.
- **Quality Assurance:** BOM add confidence to the repair process by helping ensure the right part is installed on the equipment—not just the one that fits. BOM also significantly reduce the possibility of installing the wrong part and possibly causing early and potentially catastrophic equipment failure.
- **Improved Stocking:** BOM are an integral part of stocking strategies. They also help determine if the right part is being stocked.

Tying an asset to its repair materials helps integrate maintenance and inventory management activities. Establishing the link between an asset and its spare parts supports both asset reliability and inventory cost management objectives. In short: **complete and accurate asset MRO BOM are critical to reducing MRO costs, improving asset reliability, and increasing maintenance productivity.**

## RESPONSIBILITY

Developing, maintaining, and retiring asset MRO BOM is the responsibility of Engineering and Maintenance.

## TIMING

BOM must be kept complete and accurate at all times and updated before new or modified equipment is put into service.

## LOCATION

BOM are maintained in the EAM system for all equipment at the site.

## REQUIREMENT

- At a minimum, all critical facility equipment must have complete and accurate BOM. Ideally, every piece of facility equipment, regardless of criticality, should have a complete and accurate BOM.
- Each piece of equipment must have a separate BOM, even if pieces of equipment are identical.
- Each BOM must include all items that are part of the specific piece of equipment if there is a reasonable expectation that the part will be replaced during the life of the equipment.
- BOM should indicate the quantity of each part on equipment at one time.
- All parts listed on a BOM must be set up in the Materials Catalog.
- Materials Management must have complete, accurate, and up-to-date BOM in order to conduct the required annual Inventory Obsolescence Review. Inventory items not on any BOM are candidates for disposal, except for free-issue goods and consumables.

### The BOM Process

The BOM process governs the development, maintenance, and retirement of asset MRO BOM. Collectively, these activities establish complete and accurate links between equipment and spare parts used to maintain this equipment.

#### BOM Development: New Equipment

The Project Manager is responsible for obtaining the list of spare parts as new equipment is installed, or if previously installed equipment is modified through project engineering.

As BOM are developed, the list of spare parts is submitted to the MRO Materials Focus Team for review and entry into the Materials Catalog. Items are further reviewed to determine eligibility for stocking.

*Note: Not all materials identified on asset MRO BOM qualify for stocking. However, Materials Catalog records should be created for all BOM items and assigned to appropriate equipment.*

As item numbers are assigned, BOM are loaded using the prescribed screen(s) found in the Equipment / Asset Module of the EAM system. Loading item numbers helps ensure that information on new parts and materials required to maintain this new equipment or modified equipment is within reach as soon as the equipment is put into service.

#### BOM Development: Existing Equipment

When existing BOM are inaccurate or incomplete, two approaches can be taken to fix the problem. The first approach is to fix it as you go. The second approach, described below, is to treat the problem like a project, and assign specific resources to verify and update asset MRO BOM. In most cases, resource availability and the completeness of the BOM determine the approach used.

The project approach uses the Equipment Focus Team to review and update BOM for all active facility equipment, starting with critical equipment and equipment with large amounts of work order activity.

The Equipment Focus Team comprises equipment experts from Operations, Maintenance, and possibly the OEM. It is assigned to specific assets or asset classes, and it is divided between electrical and mechanical disciplines.

The team performs asset walk-downs and accesses manufacturer and EAM system work order history information to identify the asset BOM. Their goal is to confirm, to the best of their knowledge, that all active assets have complete and accurate BOM. Critical spares (i.e., materials critical to the operation of critical assets) are also identified during development of BOM. At a minimum, all critical assets must have a confirmed BOM.

The Equipment Focus Team should concentrate its efforts initially on critical assets and the assets that generate the most work order activity. Information about asset criticality and work order activity is available from the EAM system.

To support this process, Materials Management personnel identify stock maintenance and repair materials *not* associated with a BOM. This list is sorted by the commodity most critical to the facility (e.g., motors) and then reviewed for “where used” information. Once this information is determined, the BOM is updated accordingly. Maintenance materials not associated with an asset become candidates for obsolescence review, inventory disposal, and investment recovery.

### **BOM Maintenance**

Once BOM are confirmed for a specific piece or class of equipment, the process moves from the Equipment Focus Team and Engineers into a maintenance mode. It is subsequently managed on an ongoing basis by the Maintenance Planner.

As the Maintenance Planner estimates new job material requirements for a piece of equipment, the asset BOM is reviewed, and the Planner makes a note if a part necessary for a job is not listed on the BOM. The Planner, possibly with the help of Maintenance Technician(s), determines if the material should be added and updates the BOM accordingly.

However, not all materials issued to work orders pass through the formal planning process. To monitor materials charged to work orders outside of this process, and to aid BOM maintenance, the Maintenance Supervisor reviews every day the materials charged to work orders that are *not* tied to BOM. The Planner, through the EAM system, can view items charged to work orders *not* attached to BOM. This information can be reviewed with the Maintenance Technician(s) who performed the work, and decisions made to add or not add these materials to the BOM. The review also includes materials that were charged to a work order but should not have been (e.g., Operational supplies). In such instances, the Maintenance Planner notifies the Maintenance Supervisor and follows up with the Maintenance Technician to correct the stock issue transaction.

As work orders are completed, the Maintenance Supervisor reviews work order feedback and stock returns to ensure that BOM are kept accurate and up-to-date.

*Note: BOM practice relies heavily on accurate inventory / work order transactional histories, so correct issue, return, and receipt transactions are critical to the process.*

## BOM Retirement

Once an asset is retired, it is the responsibility of the Equipment Focus Team to identify the OEM materials specific to that piece of equipment and provide this information to the MRO Materials Focus Team. These materials become candidates for obsolescence review and disposal.

Asset retirement may also make it possible to reduce inventory for items used on other assets in the facility.

## Prerequisites for Quality BOM

- **Accurate Inventory and Equipment Records:** Accurate inventory and Equipment Master records are critical to building and maintaining asset MRO BOM. To prioritize the effort, asset criticality codes must be assigned to all equipment records.
- **Quick Access to Spare Parts / Materials for Equipment Repairs:** Effective materials planning allows anyone planning a job, or needing to access required spare parts for a given repair job, to quickly identify the correct part(s) needed through the associated BOM. Effective materials planning facilitates the inventory transaction and ensures that the correct part is identified, located, reserved, and eventually issued against the proper work order.
- **Accurate Stocked-Parts Usage Information:** Accurate inventory and on-demand transactional histories are imperative for creating quality BOM. Stock issue information is studied and used to help build and maintain BOM.

## PROCEDURE

Responsibility	Activity	Reference
<b>BOM Development</b>		
Project Manager	1. Identify repair materials and parts needed to support and maintain pre-commission equipment.	
Equipment Focus Team	1. Determine criticality of repair materials requested. 2. Help determine if items should be stocked on site.	
Materials Catalog Manager	1. Manage catalog setup request (CSR) process for all approved items. 2. Process all necessary forms for creation of new Materials Catalog stock or non-stock numbers for approved items. 3. Provide all assigned numbers, both stock and direct expense, to Maintenance Planner for addition of items to asset BOM. 4. Order necessary parts to set up inventory in storeroom.	

Responsibility	Activity	Reference
MRO Materials Focus Team	1. Approve and implement inventory setup request.	
Maintenance Planner	1. Attach item numbers to BOM of assets indicated.	
<b><i>BOM Maintenance</i></b>		
Maintenance Planner	1. As jobs are planned, note if any items required are not on BOM and adjust if necessary.	
<b><i>BOM Retirement for Decommissioned Assets</i></b>		
Equipment Focus Team	1. Review equipment change notification (ECN) with MRO Materials Focus Team.	
MRO Materials Focus Team	2. Notify Materials Management of items on BOM for asset being retired.	
Storeroom Supervisor	1. Review “where used” information on parts for retired asset. 2. If part is not used on any other assets in the facility, begin Obsolescence, Disposal, and Investment Recovery process. 3. If part is used on other assets in the facility, explore opportunities for stock reduction. 4. Provide Materials Catalog Manager with updated item information.	