



## Relational Data and Normalization How it affects CMMS implementation

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### Parent to Child relations and Normalization in a CMMS

Some Computerized Maintenance Management Systems (CMMS) require relating all equipment by a nested parent to child relation. This is required to accommodate management reports, especially for summing costs for all equipment within a process or location. For example every equipment record requires a lower and higher relation to a parent equipment and child equipment, so that the entire system is related. But this can lead to confusion and a difficult implementation. The parent to child relation is organized external to the CMMS usually in spreadsheets. When the numbering system is complete in spreadsheets, the equipment information is imported to the CMMS. Users are told not to change equipment numbers.

Most enterprise systems do not allow changing an equipment number because it is considered a fixed asset. In my opinion, this is more evident in systems that were originally accounting systems, then as an afterthought added CMMS functions to the accounting system. A separate asset column can provide a cross-relation from equipment number to asset, but this complicates implementation.

Also the lack of normalization rules in the database leads to the user rule not to change parent codes. Some systems are not completely normalized, so information that should not be repeated is repeated in columns in many records. Also any change to the parent key might loose child records. For example, when changing the equipment number, work orders loose their relation to that equipment.

### Getting started without waiting for equipment relations

Inflexible equipment numbering is one reason that such systems can require months for setup before users can even add equipment and work orders.

In Davison CMMS you select equipment by a group or location code, or even tagging, which is sufficient for reports without complicated, nested parent to child relations. In our system the local unique identifier for equipment is "Unit Code + Component Code". A component could be moved to another unit, for example a motor is a component that could be moved from a pump to another pump, and then work history remains related to that motor. The unique key in a host, where remote sites are combined, is "Site Code + Unit Code + Component Code".

Davison CMMS data is normalized so that nothing is unnecessarily repeated, and any change in key values to a parent record changes child records to keep the necessary relation. In the case of changing an equipment number, all related work orders, predictive readings, and other relations stay with the equipment. The equipment numbers in the child records are changed to keep the relation.

All codes in Davison CMMS are validated to keep normalization intact, but blank values often are allowed. This means that if the user has not decided on related preventive maintenance or other relations to equipment, they can continue to add the equipment and assign (or change) the relations later.

This does not imply that a user should just start entering equipment (or other parent information, like locations) with no planning. However, in many cases facility personnel do not need equipment numbers to find equipment by description and possibly pictures in the work order. Equipment numbers in the CMMS might not even exist on the equipment. The user should be able to start using the CMMS without a long wait for perfect equipment numbering.