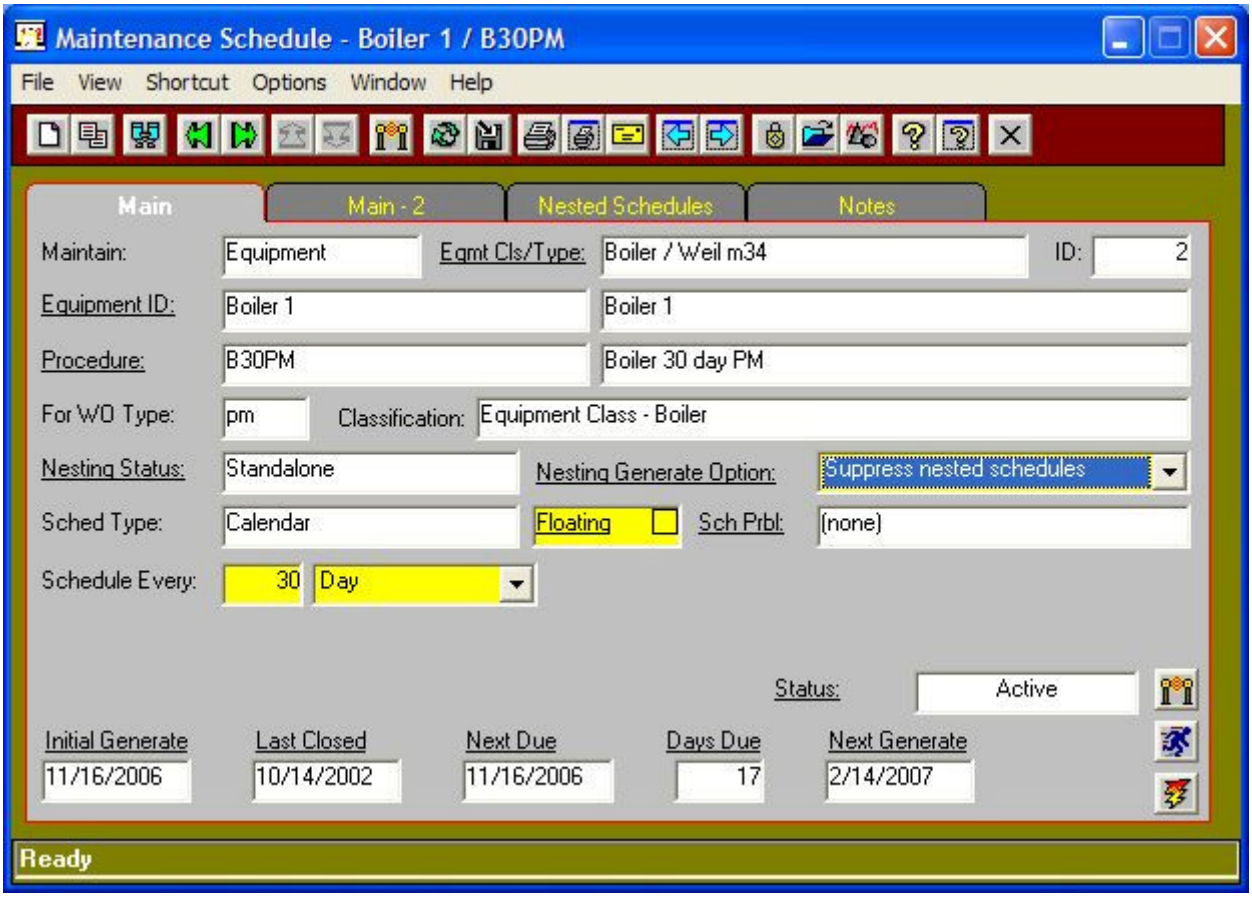
New Maintenance Scheduling Functionality

MaintScape maintenance scheduling functionality has been fully rewritten as of MaintScape Build 124 to be more powerful and flexible than its predecessor. This document is preliminary documentation for the new functionality. Non-preliminary documentation will be part of the new MaintScape documentation set which is a work in progress.

This preliminary documentation assumes an understanding of the original maintenance scheduling functionality.

Defining a Maintenance Schedule and Generating Work Orders

The main page of the new maintenance schedule detail window appears as follows:

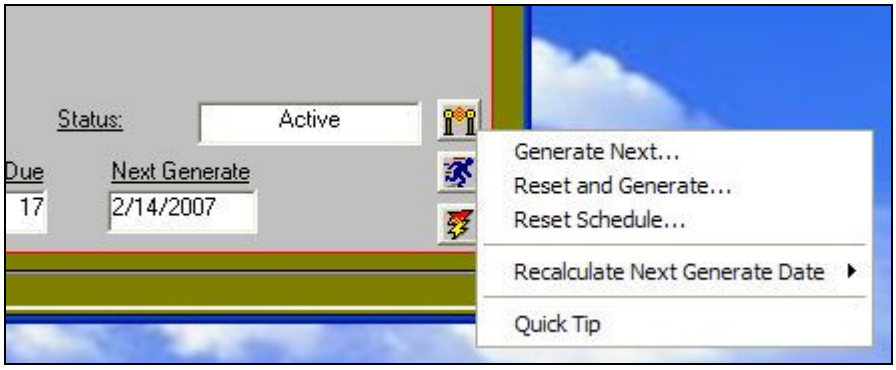


Notes:

1. The "Nesting Generate Option" field is only meaningful when maintenance schedules are nested. When two nested schedules "coincide", e.g. a monthly and quarterly maintenance are due at the same time, you can choose whether the generated work order will contain both procedures as a multi-task work order, or only contain the procedure from the less-frequent schedule (e.g. only the quarterly procedure).
2. You will see additional scheduling options that did not exist in the prior implementation if you change schedule period frequency 'Day' to 'Week', 'Month', or 'Year'.

3. ‘Initial Generate’ date is the due date of the first work order that could be generated from this schedule. ‘Initial Generate’ and ‘Baseline Generate’ dates are described in more detail below.

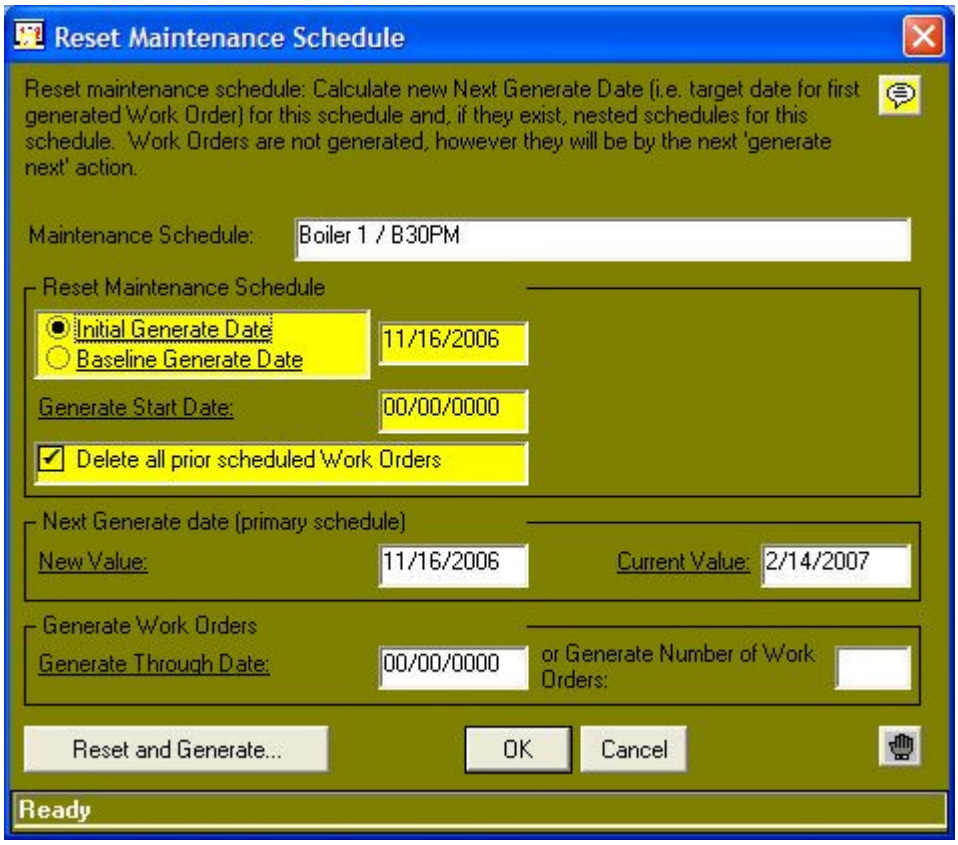
You will see the following new ‘generate’ options when you click on the ‘generate work orders’ button:



‘Generate Next…’ behaves the same as the ‘Generate’ action did in the prior implementation. In particular, it will generate a work order due on the ‘Next Generate’ date (2/14/2007), and then move the ‘Next Generate’ date forward by the schedule period (30 days). This process is repeated until your ‘generate’ termination conditions occur: either the ‘Next Generate’ date passes an ‘end date’ threshold, or a specific number of work orders have been generated.

‘Reset Schedule…’ is a new action to reset the ‘Next Generate’ date, optionally letting you delete previously generated work orders at the same time. This should greatly simplify the process of ‘fixing’ maintenance schedules. You may want to ‘fix’ your maintenance schedules if you have not been regularly generating work orders or processing generated work orders, or if the equipment has been out of service and thus not needing maintenance.

The 'Reset Schedule…' pop-up window looks as follows:



The options available to you at this point are best described by example. Bear in mind that this schedule's period is "30 days" when reviewing the examples.

Example 1 *Change "Initial Generate" date to 12/01/2006 and leave "Generate Start" date blank.*

When an "Initial Generate" date is specified and the "Generate Start" date is blank, the schedule's 'Next Generate' date is set to the "Initial Generate" date.

Subsequently generated work orders would be due on the initial generate date of 12/01/2006, and then 12/31/2006, 1/30/2007, etc.

Example 2 *Change "Initial Generate" date to 6/15/2006 and set "Generate Start" date to 11/01/2006.*

MaintScape calculates the schedule's 'Next Generate' date by repeatedly adding the schedule period (30 days) to the 'Initial Generate' date of 6/15/2006 until the first date following the 'Generate Start' date of 11/01/2006.

Subsequently generated work orders would be due 11/12/2006, 12/12/2006, 1/11/2007, etc.

Example 3 *Specify a "Baseline Generate" date of 12/01/2006 and leave "Generate Start" date blank.*

When "Baseline Generate Date" is specified and "Generate Start Date" is blank, the schedule's 'Next Generate' date is set to one schedule period past the "Baseline Generate" date. For this reason, the baseline generate date is often set to the equipment install date.

Subsequently generated work orders would be due 30 days from the baseline generate date which is 12/31/2006, and then 1/30/2007, 3/01/2007, etc.

Example 4 *Change "Baseline Generate" date to 6/15/2006 and set "Generate Start" date to 11/01/2006.*

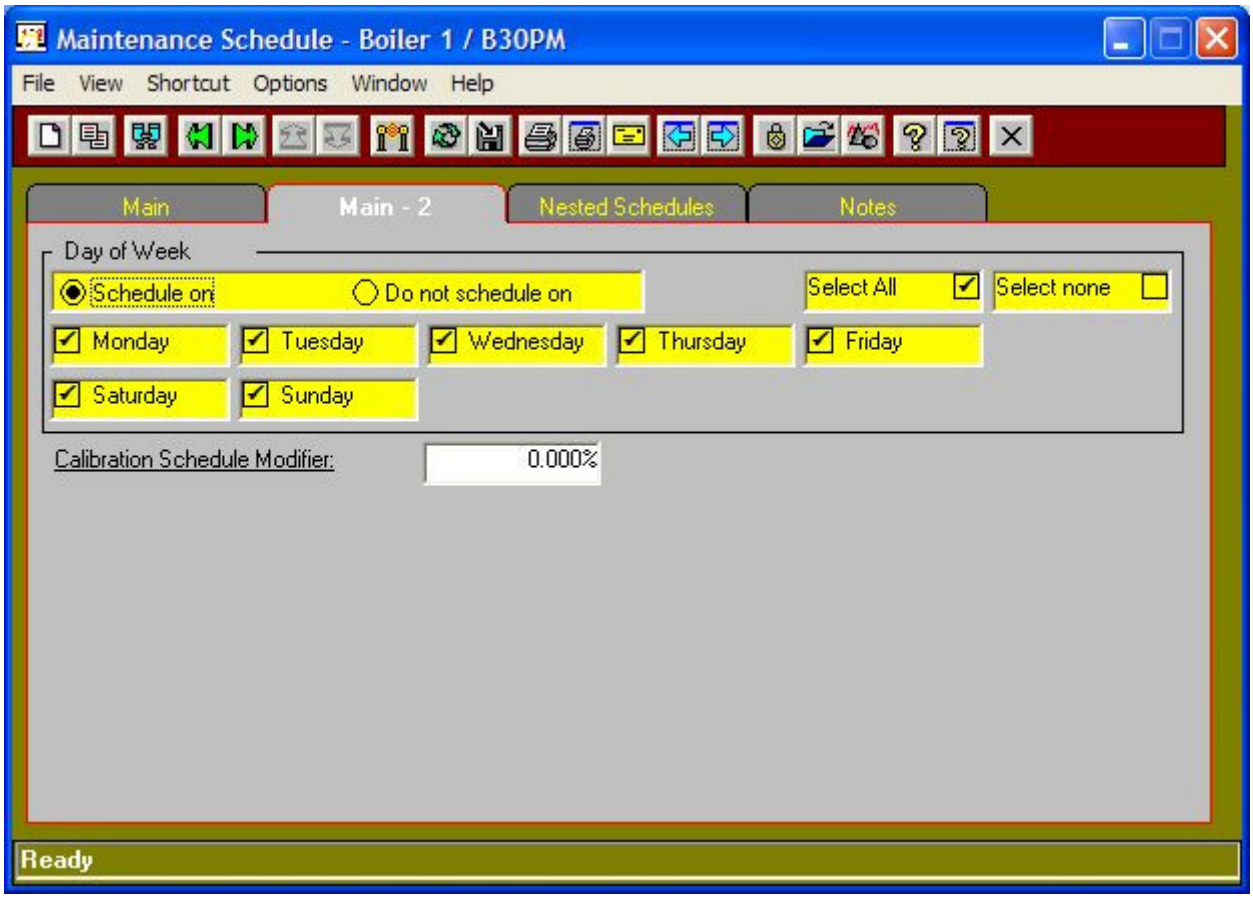
MaintScape calculated the schedule's 'Next Generate' date starting from one schedule period (30 days) after the 'Baseline Generate' date of 6/15/2006 and, if necessary, repeatedly adding the schedule period until the first date following the 'Generate Start" date of 11/01/2006.

Subsequently generated work orders would be due 11/12/2006, 12/12/2006, 1/11/2007, etc. Notice that this result is the same as example 2.

Note that the values for "Initial Generate" date or "Baseline Generate" date do not change as work orders are generated. The "Next Generate Date" value does change, however, as was the case with the prior maintenance schedule implementation.

Action "Reset and Generate…" lets you reset a maintenance schedule (as described above) and generate next work orders in one step. This is exactly the same as performing actions "Reset Schedule…" immediately followed by "Generate Next…".

The "Main – 2" page of the new maintenance schedule detail window appears as follows:



Notice that this page lets you choose which days of the week are permitted for generated work orders.

If a maintenance schedule period of every 7 days or greater calculates a work order target date on a non-permitted date (such as a particular day of the week per the screen print above), then the target date is modified to the closest permitted date backward or forward. If the schedule period were less than 7 days, then the target date is modified forward only.

Nested Maintenance Schedules

The new maintenance schedule functionality lets you "nest" maintenance schedules with related maintenance periods. For example, nested calendar maintenance schedules may generate work orders monthly, quarterly (every 3 months), and annually (every 12 months). Nested meter maintenance schedules may generate work orders every 100, 200 and 400 hours.

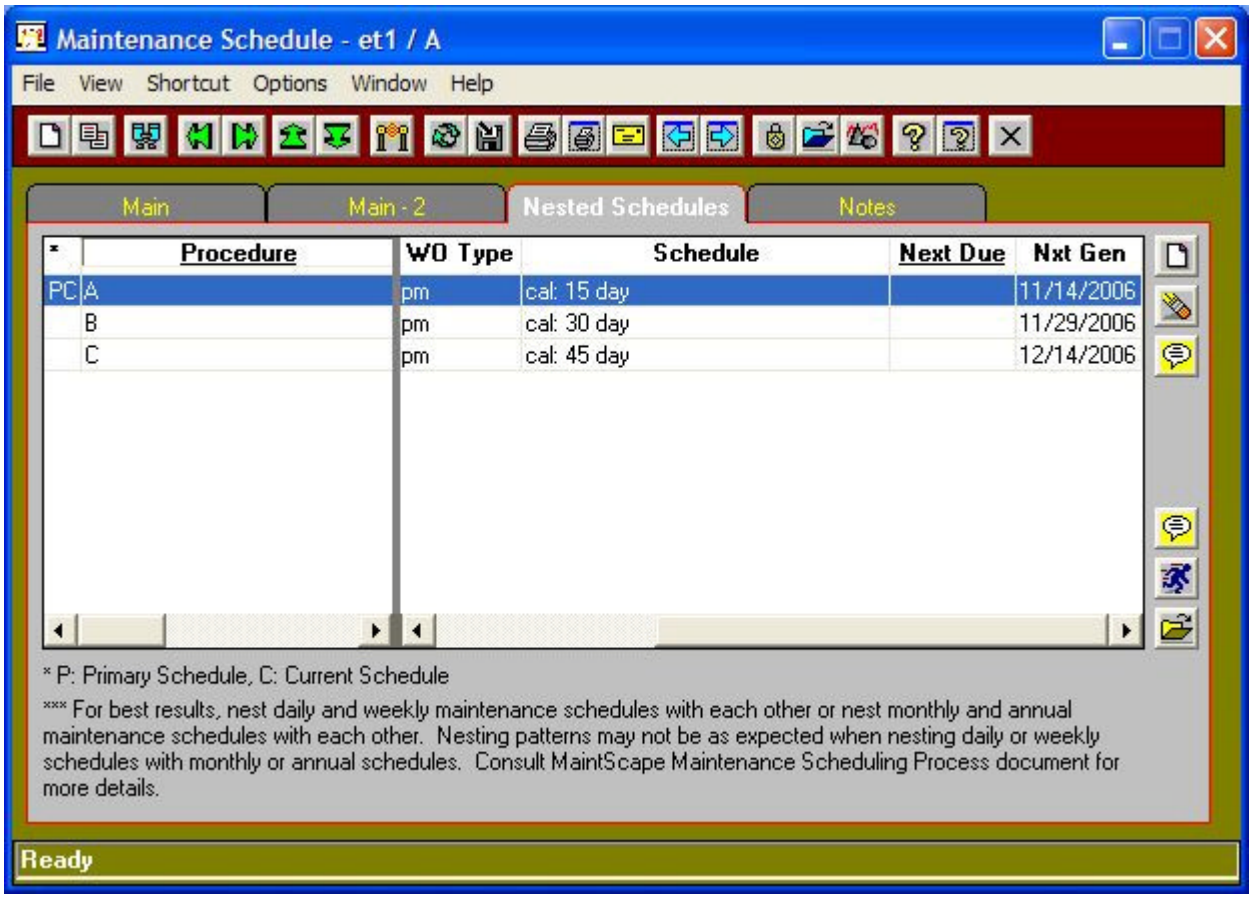
Work orders generated from maintenance schedules nested with each other periodically "coincide". For example monthly and quarterly calendar maintenance schedules coincide every quarter, or every third work order. Periods of nested maintenance schedules need not be a multiple of each other. For example, 200 and 300 hour meter maintenance schedules coincide every 600 hours, or every third work order.

When generated work orders coincide, you have a choice whether the generated work order is generated from the procedure of the least frequent maintenance schedule, or whether the generated work order is generated from the procedures of all coinciding maintenance schedules (i.e. the work order is multi-task).

The maintenance schedule that occurs most frequently is called the "primary schedule", and the other related maintenance schedules are called "nested schedules". For example, when monthly, quarterly and annual maintenance schedules are nested, the monthly maintenance schedule is primary. Similarly, when 100, 200 and 400 hour maintenance schedules are nested, the 100 hour maintenance schedule is primary.

Maintenance schedules nested with each other must maintain the same equipment (or location), and must all schedule either by calendar or meter.

Primary and nested maintenance schedules are created independently in the maintenance schedule window, however they are related to each other on the "Nested Schedules" page of the primary schedule. For example:



Click the standard "New" button to link a nested maintenance schedule with the current primary schedule. You will be given a choice to nest an already created schedule, or to add a new schedule which will then be nested. Click the standard "Delete" button to un-nest a maintenance schedule with the current primary schedule.

Nested Maintenance Schedule Processing – Calendar Schedules

Consider the above example of 30 day and 45 day maintenance schedules nested to a primary 15 day maintenance schedule. Please note that these maintenance schedules are non-floating. Floating maintenance schedules are discussed further below.

The "next generate" dates of these schedules are repeated below (these were likely set by resetting the primary schedule to a baseline generate date of 10/30/2006):

Maintenance Schedule	A (15 day)	B (30 day)	C (45 day)
Next Generate Date	11/14/2006	11/29/2006	12/14/2006

The next generated work order for this set of nested maintenance schedules will be for procedure "A" only, and will be due 11/14/2006. After generating the work order, this schedule's "Next Generate" date will advance by the schedule period (15 days) so that "next generate" dates of all nested schedules are as follows:

Maintenance Schedule	A (15 day)	B (30 day)	C (45 day)
Next Generate Date	11/29/2006	11/29/2006	12/14/2006

The next generated work order for this set of nested maintenance schedules will be for procedure "A" and "B" since their schedule's coincide. If the primary maintenance schedule's "Nesting Generate Option" value is "Suppress Nested Schedules", the generated work order will be for the less frequent procedure only (procedure "B"). If the primary maintenance schedule's "Nesting Generate Option" value is "All nested schedules in one WO", the generated work order will be a multi-task work order containing tasks for procedure "A" and procedure "B".

After generating the work order, maintenance schedules for procedure "A" and "B" will both have their "Next Generate" date advance by their respective schedule period (15 days and 30 days) so that "next generate" dates of all nested schedules are as follows:

Maintenance Schedule	A (15 day)	B (30 day)	C (45 day)
Next Generate Date	12/14/2006	12/29/2006	12/14/2006

The next generated work order for this set of nested maintenance schedules will be for procedure "A" and "C" since their schedule's coincide. And so the process continues…

It is important to briefly discuss what it means for maintenance schedules in a nested relationship to "coincide". The chart below illustrates "coincidence" rules for calendar maintenance schedules depending on their schedule period type:

	Daily	Weekly	Monthly	Annual
Daily	Same date	Same date	Same date	Same date
Weekly	Same date	Same week	Same week	Same week
Monthly	Same date	Same week	Same month	Same month
Annual	Same date	Same week	Same month	Same year

Please note that "same week" is based on a week starting on Sunday and ending the next Saturday.

For example:

- Nested daily maintenance schedules coincide if their next generate dates are the same. This was illustrated in the example above.

  You may want to avoid nesting maintenance schedules with larger daily periods when certain days of the week are omitted. For example, avoid nesting 30 and 180 day schedules to occur only Monday through Saturday. In this case, assume the first work order generated from the 30 day schedule is bumped off of a weekend day to Monday. Then the 6th 30 day work order from this schedule will not be on the date of the first work order from the 180 day schedule, and the two maintenance schedules will not be considered to coincide. Instead, consider nesting 1 month and 6 month schedules instead.

- A daily maintenance schedule coincides with a nested weekly maintenance schedule if their next generate dates are the same.

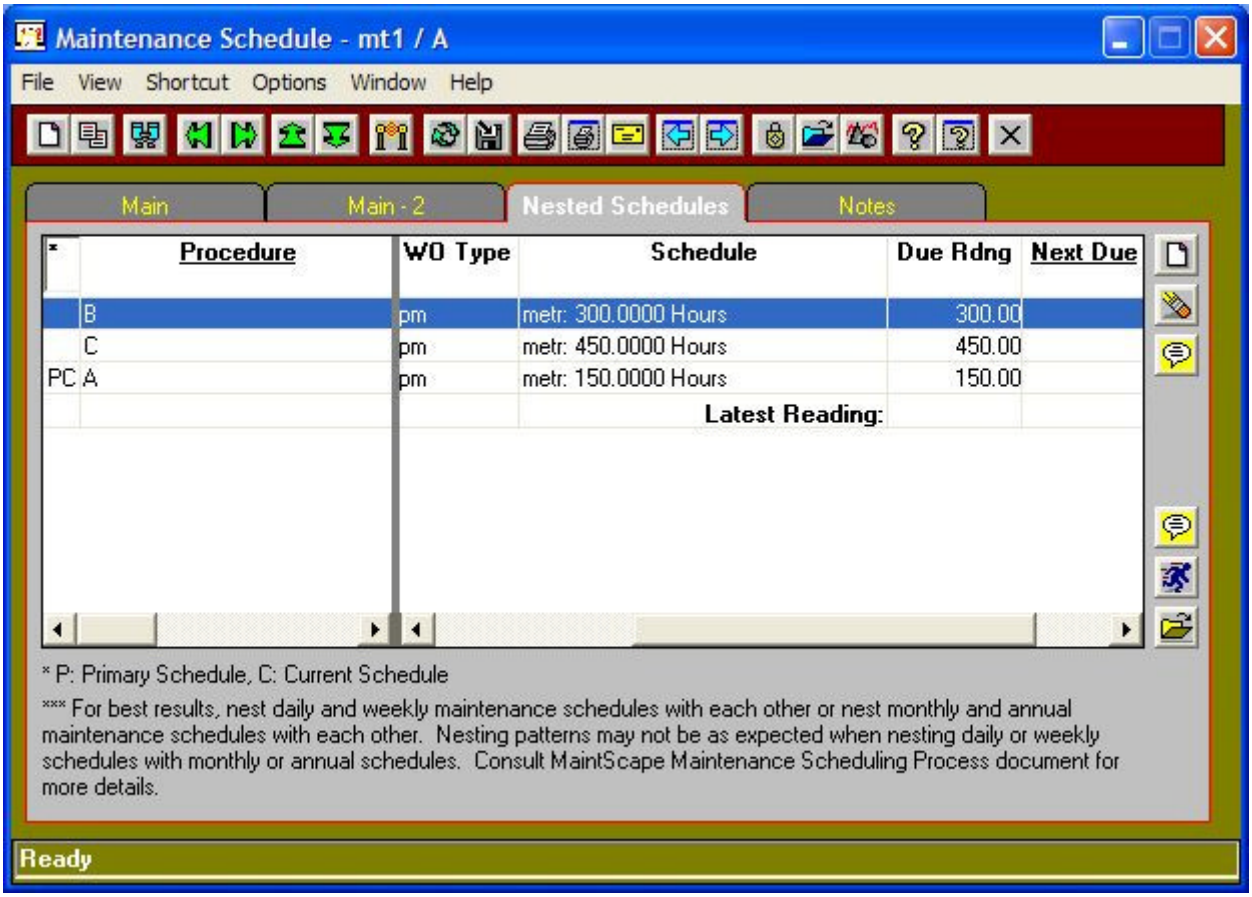
- Nested weekly maintenance schedules coincide if their next generate dates occur within the same week (Sunday through Saturday).

- A weekly maintenance schedule coincides with a nested monthly maintenance schedule if their next generate dates occur within the same week (Sunday through Saturday).
- Nested monthly maintenance schedules coincide if their next generate dates occur within the same month.
- Etc.

Notice that, for nesting purposes, a 14 day maintenance schedule is not the same as a 2 week maintenance schedule.

Nested Maintenance Schedule Processing – Meter Schedules

An example "Nested Schedules" page for nested meter maintenance schedules appears below. Please note that these maintenance schedules are non-floating. Floating maintenance schedules are discussed further below.



The "next due" readings of these schedules are repeated below:

Maintenance Schedule	A (150 hours)	B (300 hours)	C (450 hours)
Next due reading	150	300	450

As was the case with the prior implementation, work orders are generated from meter maintenance schedules when a meter reading is entered greater than or equal to a "next due" reading value.

For example, a meter reading value of 150 will generate a work order for procedure "A". After generating the work order, this schedule's "next due" reading will advance by the schedule period (150 hours) so that "next due" readings of all nested schedules are as follows:

Maintenance Schedule	A (150 hours)	B (300 hours)	C (450 hours)
Next due reading	300	300	450

Lets say the next meter reading entered is for 320 hours. This will generate a work order for both procedure "A" and "B". If the primary maintenance schedule's "Nesting Generate Option" value is "Suppress Nested Schedules", the generated work order will be for the less frequent procedure only (procedure "B"). If the primary maintenance schedule's "Nesting Generate Option" value is "All nested schedules in one WO", the generated work order will be a multi-task work order containing tasks for procedure "A" and procedure "B".

After generating the work order, maintenance schedules for procedure "A" and "B" will both have their "Next Due" reading values advance by their respective schedule period (150 hours and 300 hours) past the triggering meter reading value. Note that the triggering meter reading value is 20 hours beyond that necessary to trigger the work order. Therefore, in order to preserve nesting, the "Next Due" meter reading for procedure "C" is offset forward by 20 hours as well. The end result is as follows:

Maintenance Schedule	A (150 hours)	B (300 hours)	C (450 hours)
Next due reading	470	620	470

IMPORTANT: If an upcoming maintenance schedule such as that for procedure "C", above, should not have its period adjusted to preserve nesting, then either meter readings should be entered on a very regular basis (to minimize the offset amount) or the maintenance schedules should not be nested.

Floating Maintenance Schedules and Nesting

As was the case with the prior implementation of maintenance schedules, characteristics of a floating maintenance schedule are changed when the next due work order corresponding to the maintenance schedule is closed. If the corresponding maintenance schedule is nested, then all maintenance schedules in the nesting relationship are changed. The changed characteristics alter when the next work order will generate.

Maintenance schedules in a nesting relationship must be either all floating or all non-floating.

Floating Nested Calendar Maintenance Schedules

Let's assume the prior calendar maintenance schedule example consisted of floating maintenance schedules. As before, assume we reset the primary schedule to a baseline generate date of 10/30/2006. The next generate dates will be as follows:

Maintenance Schedule	A (15 day)	B (30 day)	C (45 day)
Next Generate Date	11/14/2006	11/29/2006	12/14/2006

We have to generate exactly one next due work order from a nested set of floating maintenance schedules. In this case we will get a work order for procedure "A" due 11/14/2006 and the next generate dates will adjust as follows:

Maintenance Schedule	A (15 day)	B (30 day)	C (45 day)
Next Generate Date	11/29/2006	11/29/2006	12/14/2006

Behavior so far is no different than with non-floating maintenance schedules. Let's next assume the generated work order due 11/14/2006 is closed on 11/16/2006 - two days past the due date. MaintScape will "float" all next generate dates forward by two days, and thus the dates will appear as follows:

Maintenance Schedule	A (15 day)	B (30 day)	C (45 day)
Next Generate Date	12/01/2006	12/01/2006	12/16/2006

MaintScape will then immediately generate the next work order for this nested set of maintenance schedules due 12/01/2006 for procedure "A" and "B". As before, the work order will contain either a task from procedure "B" or tasks from both procedures depending on the setting of maintenance schedule attribute "Nesting Generate Option".

After generating the work order, maintenance schedules for procedure "A" and "B" will both have their "Next Generate" date advance by their respective schedule period (15 days and 30 days) so that "next generate" dates of all nested schedules are as follows:

Maintenance Schedule	A (15 day)	B (30 day)	C (45 day)
Next Generate Date	12/16/2006	12/31/2006	12/16/2006

The above process will repeat when the generated work order due 12/01/2006 is closed.

Floating Nested Meter Maintenance Schedules

Let's assume the prior meter maintenance schedule example consisted of floating maintenance schedules. The "next due" readings of these schedules are initially as follows:

Maintenance Schedule	A (150 hours)	B (300 hours)	C (450 hours)
Next due reading	150	300	450

A meter reading of 170 will generate a work order for procedure "A". As would be the case if the schedules were non-floating, next due reading values adjust to the following:

Maintenance Schedule	A (150 hours)	B (300 hours)	C (450 hours)
Next due reading	320	320	470

As in the prior example, next due readings for nested schedules that did NOT generate a work order also adjust in order to preserve nesting.

The generated work order for procedure "A" has been created. Before this work order is closed, lets assume a new meter reading is entered of 200 hours. This will not generate a new work order because this value is lest than the next due reading values of all maintenance schedules. Let's now assume the generated work order is closed. MaintScape will then "float" the next due reading values of all the maintenance schedules forward by 30 hours, which represents the difference in meter readings between the time the work order was created (170 hours) and the time the work order was closed (i.e. the time the work was done) (200 hours). Next due reading values will be as follows after this adjustment:

Maintenance Schedule	A (150 hours)	B (300 hours)	C (450 hours)
Next due reading	350	350	500

IMPORTANT: If an upcoming maintenance schedule such as that for procedure "C", above, should not have its period floated forward, then either generated work orders should be done and closed promptly or the maintenance schedules should not be floating.