Mastering Out-of-Sequence Progress – Part 3

By Ron Winter, PSP, FAACE

Introduction

Identifying out-of-sequence progress in the real-world can be the key to understanding disruption and productivity loss. This is a current CPM ”hot topic”. Now significant, new information and unusual situations involving out-of-sequence progress have been discovered since last year’s conference.

Certain cases of out-of-sequence events have been impossible to identify until now. This paper explains a new technique to identify all cases of out-of-sequence progress, even previously undetectable inactive indirect out-of-sequence activities. An even larger database of schedules is cataloged and presented as more accurate benchmarks. These benchmarks can be easily applied to rate other schedules to evaluate their degree of out-of-sequence progress.

Last year, better out-of-sequence progress reporting using P6 software was introduced. This year learn how to add out-of-sequence progress reporting to Microsoft Project. The instructions included here are all that is needed to add this feature to any MS Project software (and for free)!

Recap of Previous Findings

Earlier papers [1,2,3] have illustrated that out-of-sequence progress can be categorized into two different sets of overlapping groups. Activities statused as having occurred out of logical sequence [4,5] can be directly related to the predecessor activity or indirectly related through other activities. The simple CPM network using only finish-to-start relationships with zero lag (FS/0) displayed in Figure 1 below illustrates this difference.

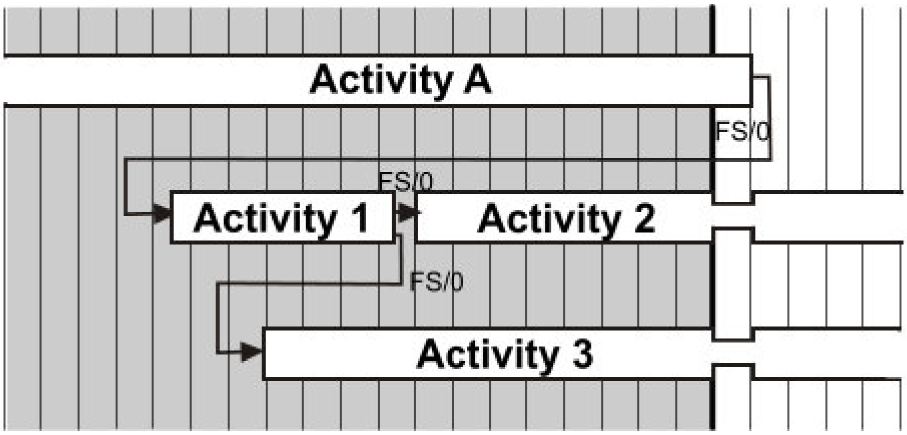


Figure 1, CPM Network Showing Out-of-Sequence Progress

Activity 1 began before Activity A finished, meaning that it started directly out-of-sequence to Activity A. It further violated the planned logic sequence by finishing before Activity A finished. This does not ”absolve” Activity 1 of being out-of-sequence; it actually increases the severity of the logic ”bust”.

Activity 2 started in accordance to the planned logic after Activity 1 finished, so it appears not to be out-of-sequence. The second activity still started earlier than Activity A finished, meaning that it indirectly started out-of-sequence through Activity 1. This can be verified by noting the work gap necking immediately following the data date that is caused by the application of the Retained Logic Critical Path Method (CPM) calculation mode. This gap indicates that Activity 2 cannot logically resume at the data date but must wait until Activity A is finished.

Activity 3 is even more unusual. It started directly out-of-sequence to Activity 1, and, like Activity 2, also started indirectly out-of-sequence to Activity A. To prevent double-counting the out-of-sequence statistics, it is appropriate that this hybrid of both types be considered merely as directly out-of-sequence.

To identify indirect out-of-sequence activities, begins with the first observed direct out-of-sequence activity (such as Activity 1 above) and traces all successors until they stop occurring out-of-sequence to the original predecessor activity. Instead of using the existing logic, imagine a ‘short-cut’ relationship from the original incomplete activity (such as Activity A in the example above) to the activity being tested for indirect out-of-sequence logic. Figure 2 below illustrates this technique.

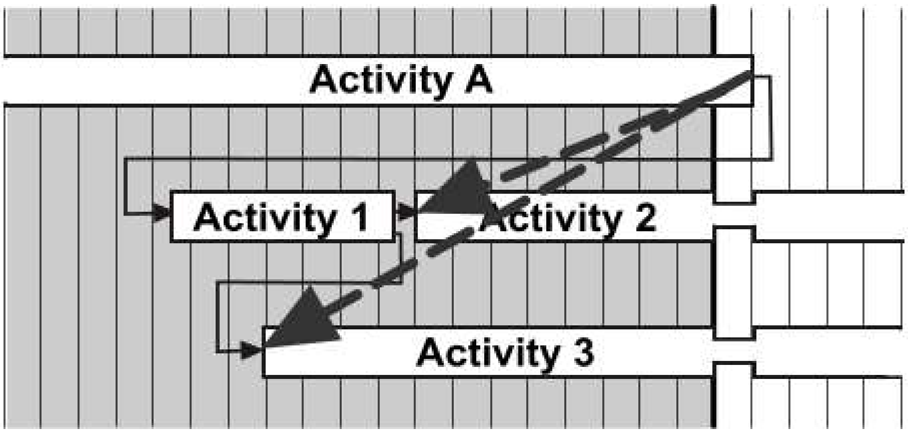


Figure 2, Testing for Indirect Out-of-Sequence

If the activity being tested for indirect out-of-sequence is related through a finish logical tie, then a Finish-to-Finish envisioned logic tie would be used instead of the Finish-to-Start one depicted above.   This tracing of all successor activities ends when the successor activity in question is found to not be directly out-of-sequence or when a new directly out-of-sequence activity is uncovered.

A second set of out-of-sequence categories qualifies whether the predecessor activity is active or inactive, depending upon the predecessor's completion status. If the predecessor activity is still active, then the Retained Logic mode will delay the re-start of any subsequent out-of-sequence activity regardless of whether it is directly or indirectly out-of-sequence. In this situation, the problem of out-of-sequence logic can be corrected by logic changes. This is the situation shown in Figure 2 above.

Figure 3 illustrates the same network except that Activity A is now complete (or finished before the current data date). Activities 1, 2, and 3 still occurred out-of-sequence (either directly or indirectly), but Activities 2 and 3 no longer show the work gap delay displayed in the previous figures.

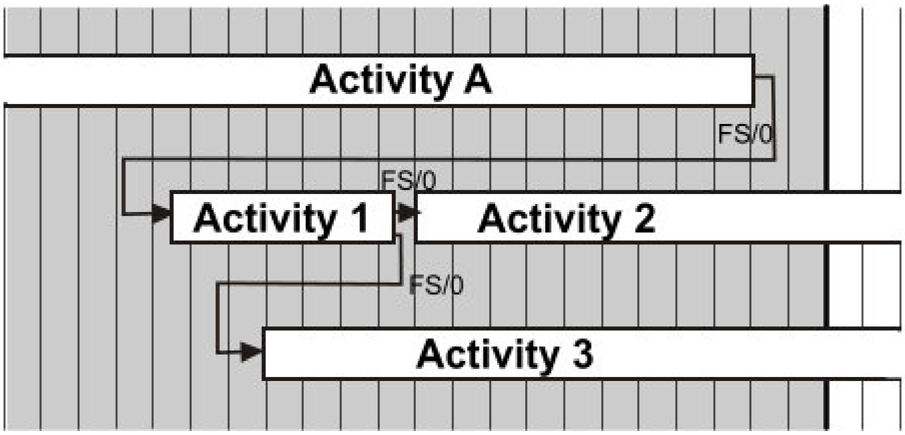


Figure 3, CPM Network Showing Inactive Out-of-Sequence Activities

Once Activity A is complete, Activities 1, 2, and 3 can be classified as inactive out-of-sequence activities. The out-of-sequence condition still exists, but logic changes will no longer have any effect upon the non-completed part of the CPM network.

Out-of-sequence occurrences can be thought of either as a failure to execute the plan properly or as a measure of the quality of the planning process while building the work schedule. If one is investigating the overall quality of the project plan and its execution, identifying inactive out-of-sequence activities is just as important as identifying active ones. Some commercial CPM software reports on this second condition while others do not.

The diagram in Figure 4 illustrates the interaction and overlap of the two different categories of out-of-sequence occurrence. Direct out-of-sequence occurrences are listed in dark blue on the top, and inactive occurrences are listed on the left side.

Inactive Direct Out-of-Sequence	**Active Direct Out-of-Sequence**
Inactive Indirect Out-of-Sequence	**Active Indirect Out-of-Sequence**

Figure 4, The Four Types of Out-of-Sequence Activities

Extending the Out-of-Sequence Reporting Domain

Previous papers on the four types of out-of-sequence activity considered Inactive Indirect Out-of-Sequence activities (the lower-left quadrant of the table in Figure 4) to be un-identifiable, and thus they were not tallied in their statistics. But now, new techniques have been developed to identify out-of-sequence activities in this formally hidden category. Now all types of out-of-sequence activity in a schedule can be tallied for more accurate results. Furthermore, this author has expanded the original study [2, 3] and evaluated additional, independent schedules which have been analyzed for out-of-sequence occurrences. The updated results of this expanded study are included herein as Attachment A.

A summary of the changes to the initial study can be viewed in Table 1, below. The new, expanded 2019 study now shows the number of workdays that the out-of-sequence activities started earlier than logically allowed, and the percentage of the total that were out-of-sequence. Changes to the statistics from the initial 2018 study are displayed to the right of those two columns. These results indicate that the occurrence of logical out-of-sequence conditions is even more acute than previously reported.

	Start Early (Workdays)	Change from Initial	Percent Total OOS	Change from Initial	Events /OOS	Change from Initial
Average	58	-12	40%	+2%	1.65	+0.02
Median	47	-11	38%	+1%	1.52	+0.29
St. Dev.	48	-8	18%	+1%	0.97	-1.14

Table 1, Updated Out-of-Sequence Statistical Findings

To summarize the updated 2019 study; analyses with a larger database revealed that out-of-sequence activities did not overlap their predecessor activity as severely as previously reported by an average of 9 days. A 61 workday average is still a very high number.

The later analysis also identified indirect out-of-sequence activities in addition to the previously reported direct ones; the average percentage observed increased from 38% to 40%, a 2 percentage point increase.

Benchmarks

Earlier papers on the effect of out-of-sequence work described two tests that can be derived from the above statistics to determine if any given schedule falls outside of one standard deviation of the observed mean (or average) of a large number of sample schedules. The formula adds the computed standard deviation of the data set to the computed mean. From the above chart, the following tests can be used to determine if a schedule is outside of one standard distribution for planning and operational quality.

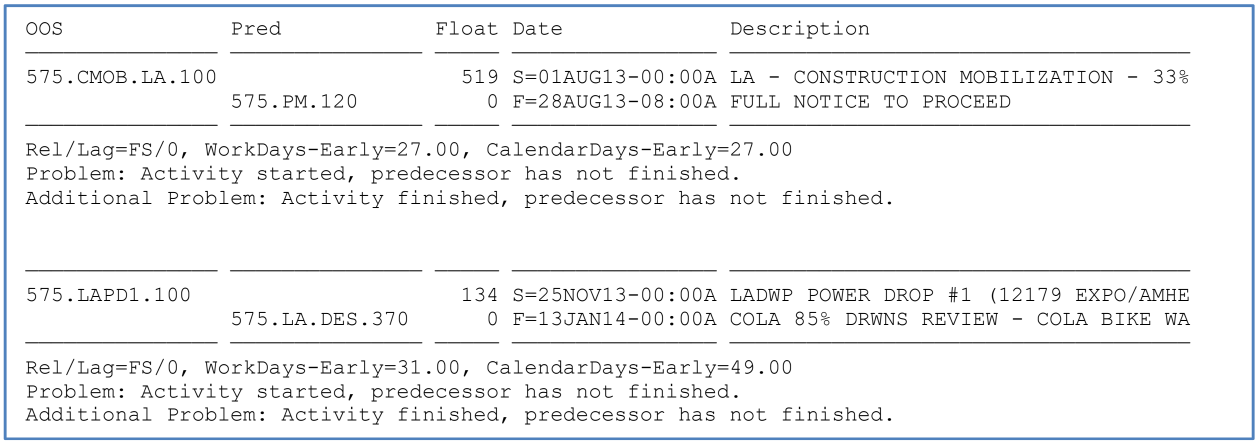
Schedules where out-of-sequence early starts exceed the norm would have a mean of early starts greater than 45 + 48 = 93 work days; ten of the schedules analyzed exceeded this figure. Schedules where the percent of out-of-sequence activities to the total would have a mean greater than 40% + 18% = 58% of the total started; six of the schedules analyzed exceeded this figure. Only one schedule in the test sample database exceeded the baseline limits of both tests for out-of-sequence quality analyses.

Filter and Report Based Upon Total Float

In addition to the types of report filters mentioned in earlier papers, an obvious one not mentioned is to filter the results based on low total float values. Including total float in the out-of-sequence report and then reporting only those activities that met a certain float threshold would be of obvious use to schedulers.

Reporting total float can be problematic; activities must register progress before their out-of-sequence nature can be observed, and once they are complete their float values will no longer be available. Thus, on any given data date only a small fraction of the entire schedule will display total float, making float a very weak reporting tool.

An obvious procedural solution [6] to this problem is to look through the earlier baseline schedules to locate one with a data date that is just before or just after the out-of-sequence activity actually started. The baseline schedule can be referenced and the total float value for that activity can be retrieved. That value can then be used for reporting and filtering purposes. Figure 5 below demonstrates a portion of a typical report using total float.



```
OOS              Pred             Float Date              Description
________________ ________________ _____ _________________ _______________________________________
575.CMOB.LA.100                     519 S=01AUG13-00:00A LA - CONSTRUCTION MOBILIZATION - 33%
                 575.PM.120           0 F=28AUG13-08:00A FULL NOTICE TO PROCEED
________________ ________________ _____ _________________ _______________________________________
Rel/Lag=FS/0, WorkDays-Early=27.00, CalendarDays-Early=27.00
Problem: Activity started, predecessor has not finished.
Additional Problem: Activity finished, predecessor has not finished.


________________ ________________ _____ _________________ _______________________________________
575.LAPD1.100                       134 S=25NOV13-00:00A LADWP POWER DROP #1 (12179 EXPO/AMHE
                 575.LA.DES.370       0 F=13JAN14-00:00A COLA 85% DRWNS REVIEW - COLA BIKE WA
________________ ________________ _____ _________________ _______________________________________
Rel/Lag=FS/0, WorkDays-Early=31.00, CalendarDays-Early=49.00
Problem: Activity started, predecessor has not finished.
Additional Problem: Activity finished, predecessor has not finished.
```

Figure 5, Out-of-Sequence Progress Report Using Total Float

Normalize Daily Work Profiles Using Percentages

The daily work profile of active out-of-sequence activities was introduced in earlier papers on out-of-sequence progress analysis. Each out-of-sequence activity is spread against a timeline using their actual start and finish date and then totaled for each day to create a daily profile of out-of-sequence work like that shown in the sample in Figure 6.

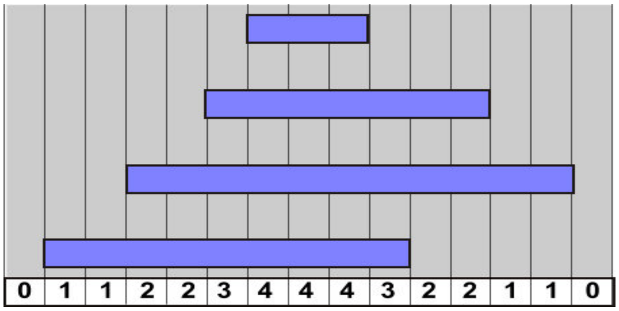


Figure 6, Sample Out-of-Sequence Daily Work Profile

These daily totals can be displayed in a chart against the total number of active activities occurring on that day. A typical chart representing both types of out-of-sequence daily totals to total active tasks is shown in Figure 7 below.

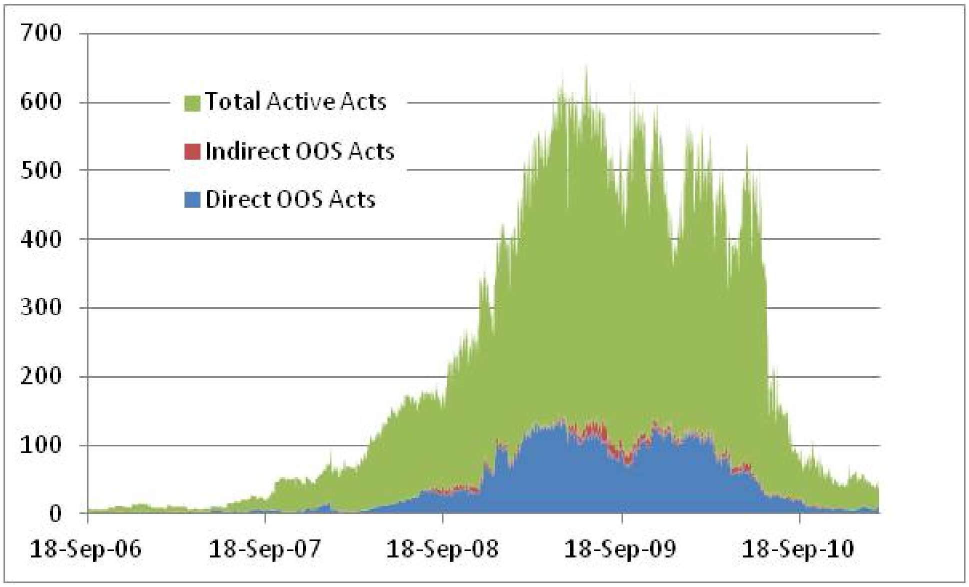


Figure 7, Sample Out-of-Sequence Daily Work Profile

Consider this important question: Does the rise in out-of-sequence progress merely mirror the overall increase of daily tasks of all activities, or is this marked increase in Figure 6 during 2009 significant? A quick method for analyzing this issue[6] is to display the daily percent of out-of-sequence activities versus the daily total. The newly developed percentage chart of the above data is shown in Figure 8 below.

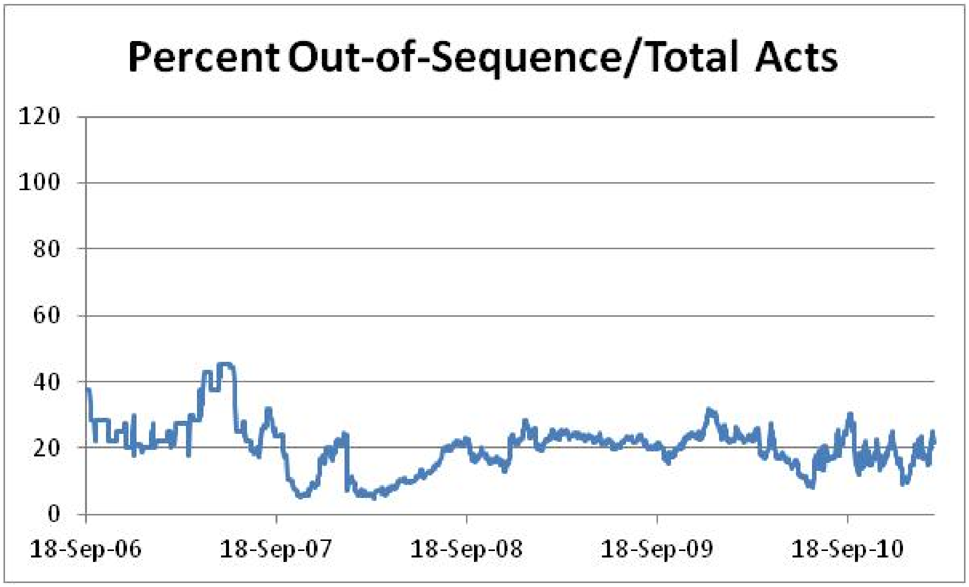


Figure 8, Sample Percent Out-of-Sequence/Total Acts

Visually, one can discern the simple truth without complex statistical analysis. In this case, the relative occurrence of out-of-sequence active activities very closely matched the total from

September 2018 through to the end of this study: A steady 20% of the activities occurring out-of-sequence (with a little of normal variance) can easily be seen. While there was a large increase from 50 to 120 active out-of-sequence activities per day, this increase closely mirrored the overall project growth during that time.

Figure 9, below, provides another example of a typical out-of-sequence daily work profile from a different construction project.

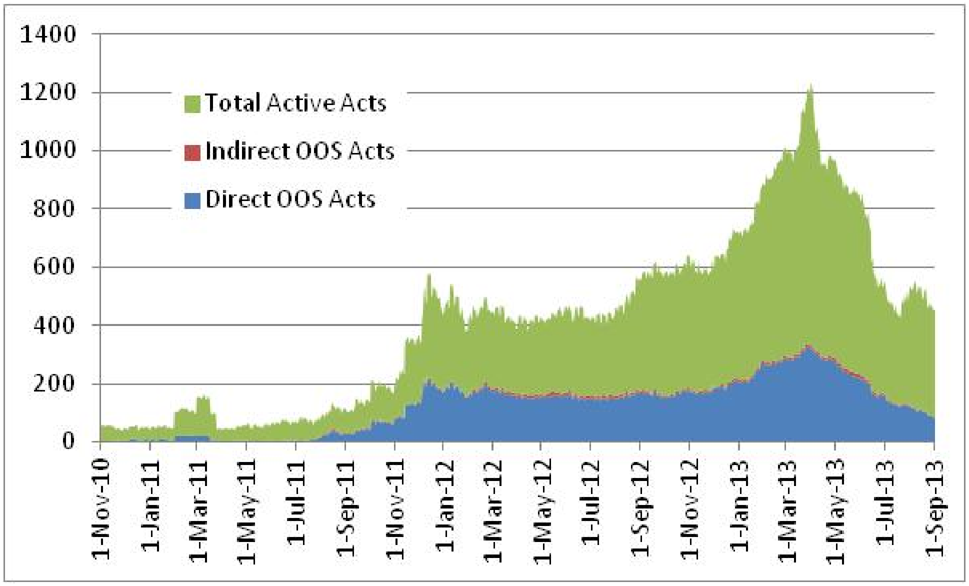


Figure 9, Different Sample Out-of-Sequence Daily Work Profile

This illustrates a further point: The relationship of total daily activities to the out-of-sequence ones is more difficult to conceptualize. Consider Figure 10, below, a chart that displays the daily percentage of active out-of-sequence activities to the total for the same project as in Figure 8.

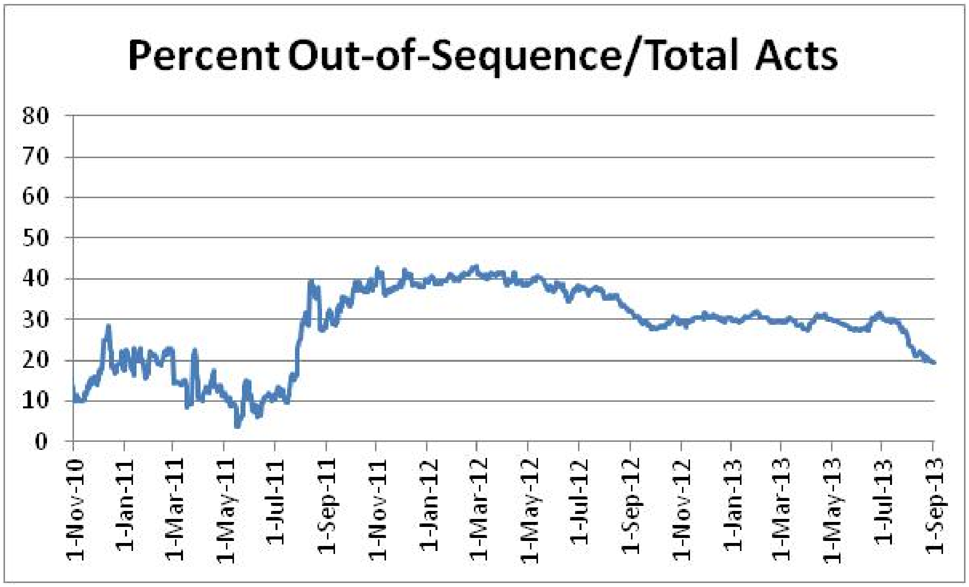


Figure 10, Different Sample Percent Out-of-Sequence/Total Acts

Figure 9 shows that in May 2011, the percent of the total jumped from 5% to 40% over a short period. This percentage remained high for the rest of the project. Clearly, some event or disruption must have occurred in July 2011 to explain the dramatic rise on working off-schedule.

Analyzing Out-of-Sequence Events versus Activities

Tracking the ratio of daily out-of-sequence events to activities can also be insightful. The following chart in Figure 11 shows the daily totals of out-of-sequence events (in red) to the number of out-of-sequence activities (in blue) that were active on that day.

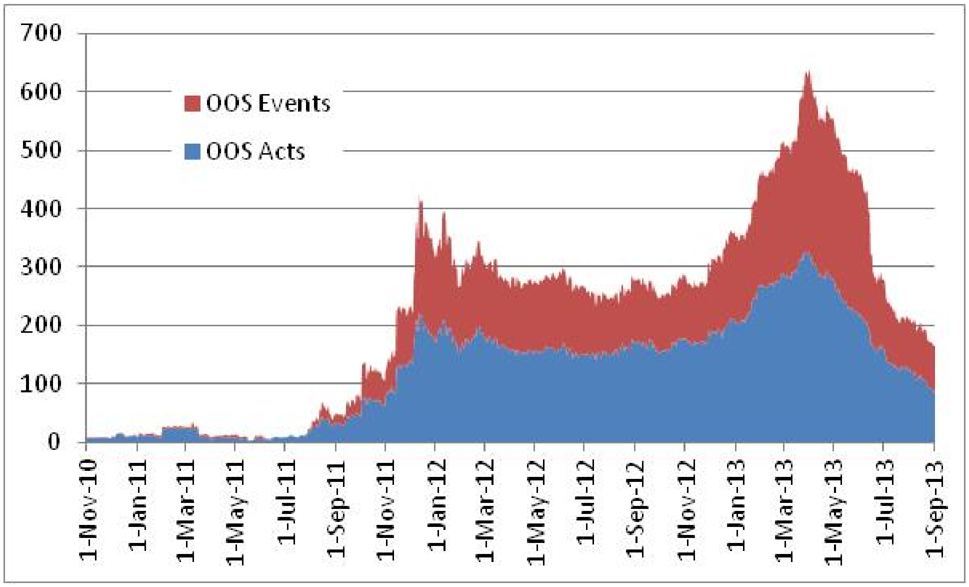


Figure 11, Sample Out-of-Sequence Events versus Activities

This type of analysis differentiating the relationship of out-of-sequence events (or individual relationships) to out-of-sequence activities was introduced last year. The overall relationship between the two curves is again difficult to discern. Plotting the ratio between the two on a daily basis yields the curve shown below in Figure 12.

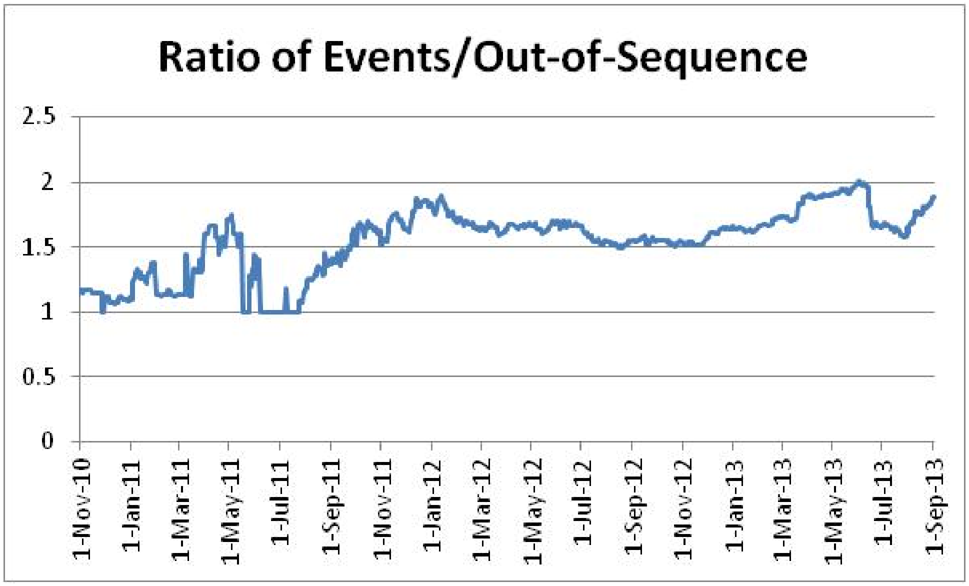


Figure 12, Sample Ratio of Events/Out-of-Sequence

The curve in Figure 12 shows that after the main work began in August 2011 the ratio of events to activities quickly increased to approximately 1.7 events per out-of-sequence activity. The ratio remained relatively constant from that point onward. The higher ratios August 2011 can be dismissed by referencing the very low volume of work.

A different project poses a difficult out-of-sequence study to identify. The following example in Figure 13 displays extreme fluctuations in the daily events and out-of-sequence activities.

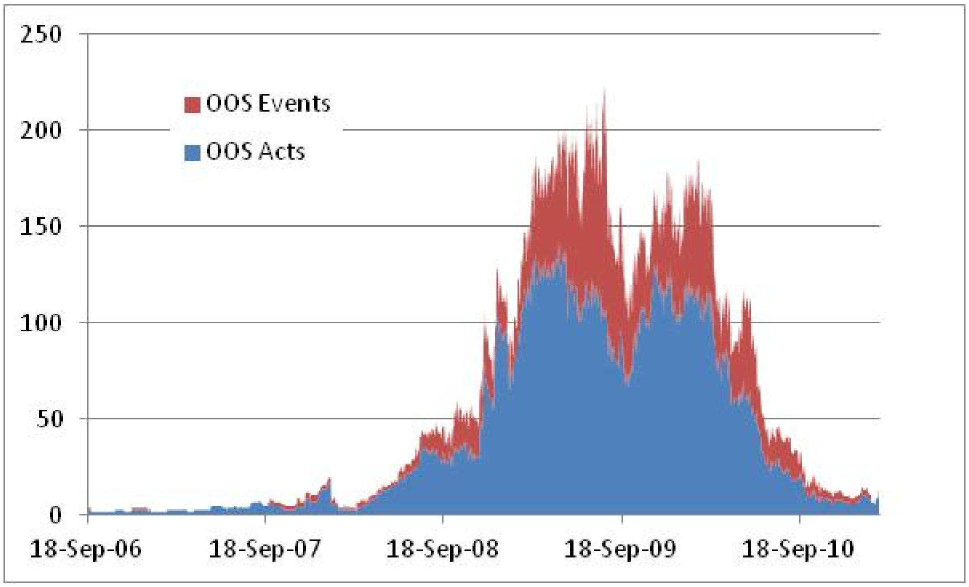


Figure 13, Different Sample Out-of-Sequence Events versus Activities

It is difficult to discern the relative nature of these two curves. When expressed as a daily ratio of the two, a better correlation can be observed, as displayed in Figure 14 below.

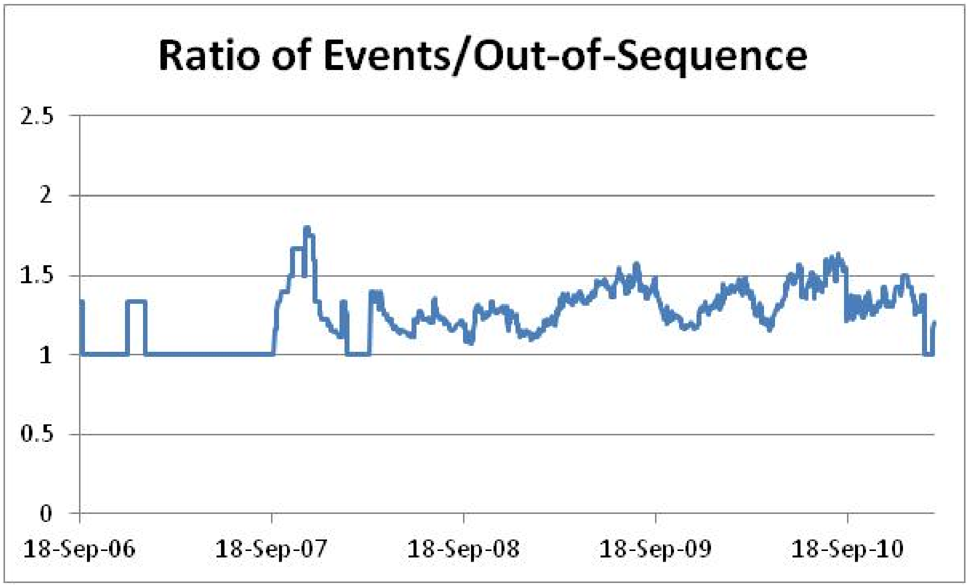


Figure 14, Different Sample Ratio of Events/Out-of-Sequence

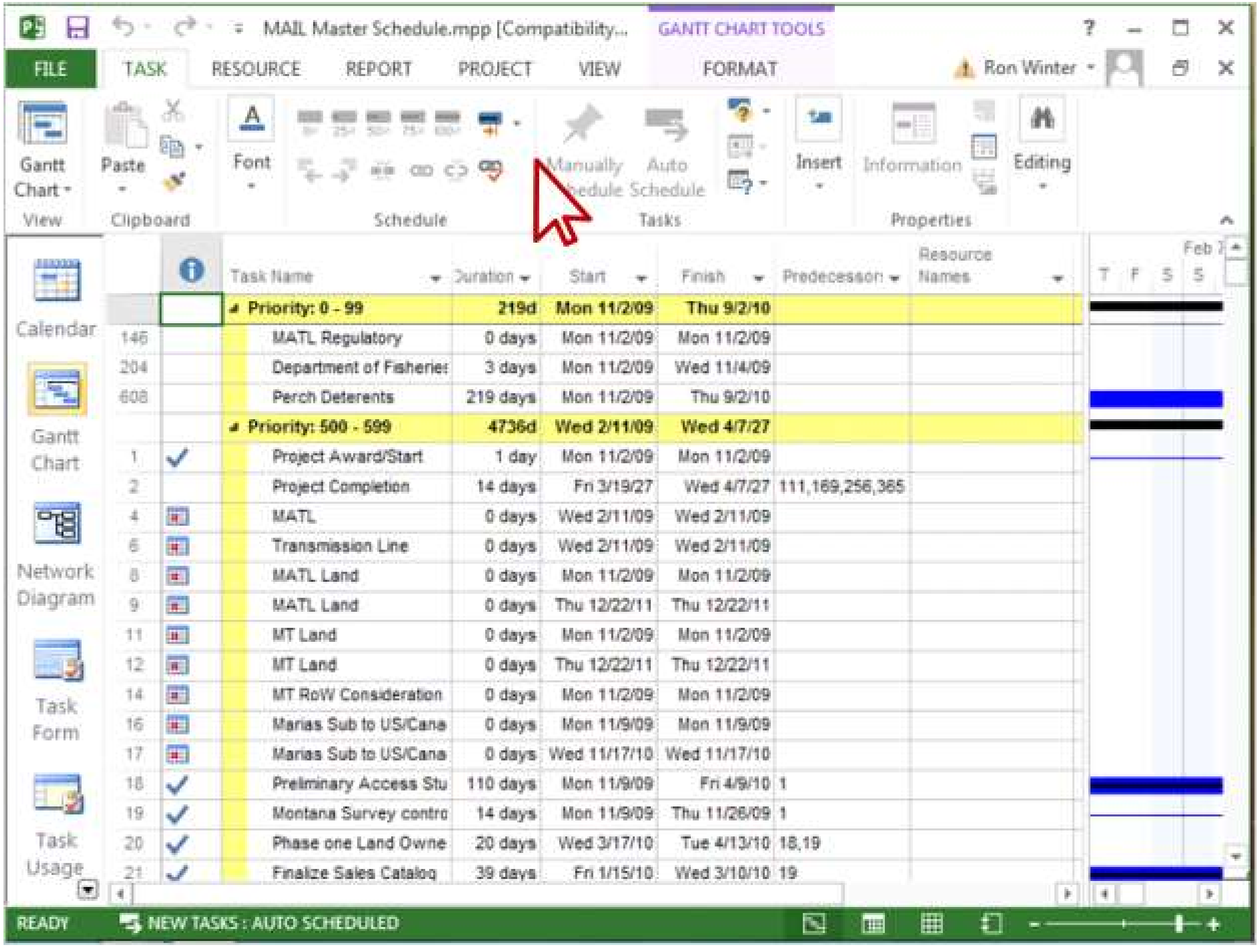
Once the project began in earnest, the daily ratio of out-of-sequence events to activities averaged around 1.3 events to activities. Once again, graphical estimation can quickly replace tedious statistical analysis.

Out-of-Sequence Report for Microsoft Project

Microsoft (MS) Project CPM scheduling software does not have a built-in out-of-sequence report. The good news is that one can be added using the built-in Visual Basic for Applications (VBA) programming facility. A freely useable, public domain script [7] is provided with this paper to allow anyone owning MS Project software to have this feature for free.

In the following instructions, there are three different types of mouse clicking actions that must be used. The reference to a standard mouse click (or just ”click”) requires that the left mouse button be pressed. A ”right-click” reference indicates that the right mouse button should be pressed instead of the left. A ”double-click” reference invokes twice clicking the left mouse button in rapid succession. If the wrong button is pressed, the following process will not complete successfully.

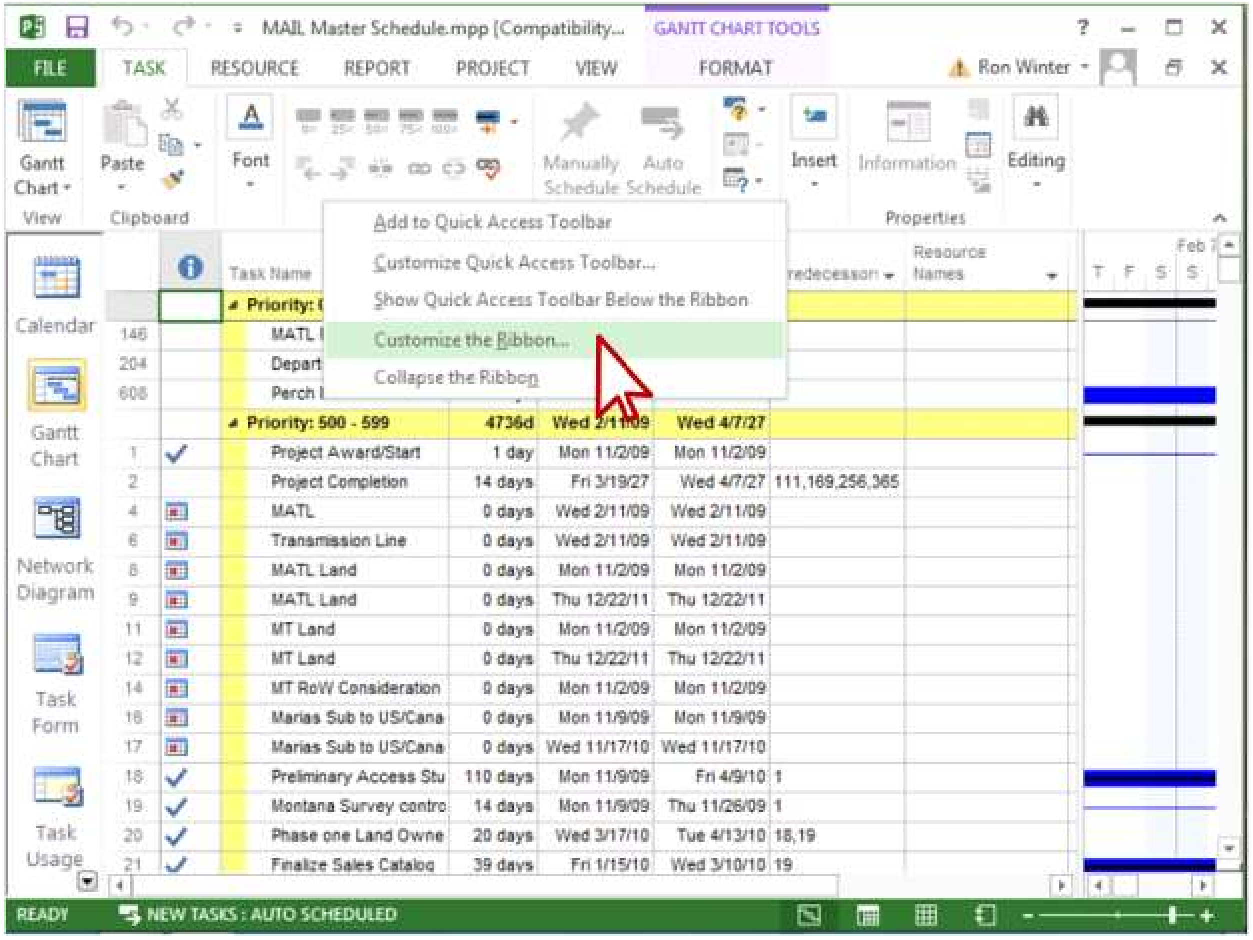
To begin programming in VBA, MS Project software should be started and a project opened like that shown in Figure 15 below. The examples below are made using Microsoft Project 2013, but this process also applies equally well for Microsoft Project 2016 software. Earlier versions of MS Project do not have a ribbon, but the following instructions will still be successful if the menu area is used instead of the ribbon.



		Task Name	Duration	Start	Finish	Predecessors	Resource Names
		Priority: 0 - 99	219d	Mon 11/2/09	Thu 9/2/10		
146		MATL Regulatory	0 days	Mon 11/2/09	Mon 11/2/09		
204		Department of Fisheries	3 days	Mon 11/2/09	Wed 11/4/09		
608		Perch Deterents	219 days	Mon 11/2/09	Thu 9/2/10		
		Priority: 500 - 599	4736d	Wed 2/11/09	Wed 4/7/27		
1	✓	Project Award/Start	1 day	Mon 11/2/09	Mon 11/2/09		
2		Project Completion	14 days	Fri 3/19/27	Wed 4/7/27	111,169,256,365	
4	▦	MATL	0 days	Wed 2/11/09	Wed 2/11/09		
6	▦	Transmission Line	0 days	Wed 2/11/09	Wed 2/11/09		
8	▦	MATL Land	0 days	Mon 11/2/09	Mon 11/2/09		
9	▦	MATL Land	0 days	Thu 12/22/11	Thu 12/22/11		
11	▦	MT Land	0 days	Mon 11/2/09	Mon 11/2/09		
12	▦	MT Land	0 days	Thu 12/22/11	Thu 12/22/11		
14	▦	MT RoW Consideration	0 days	Mon 11/2/09	Mon 11/2/09		
16	▦	Marias Sub to US/Cana	0 days	Mon 11/9/09	Mon 11/9/09		
17	▦	Marias Sub to US/Cana	0 days	Wed 11/17/10	Wed 11/17/10		
18	✓	Preliminary Access Stu	110 days	Mon 11/9/09	Fri 4/9/10	1	
19	✓	Montana Survey contro	14 days	Mon 11/9/09	Thu 11/26/09	1	
20	✓	Phase one Land Owne	20 days	Wed 3/17/10	Tue 4/13/10	18,19	
21	✓	Finalize Sales Catalog	39 days	Fri 1/15/10	Wed 3/10/10	19	

Figure 15, MS Project 2013 Screen

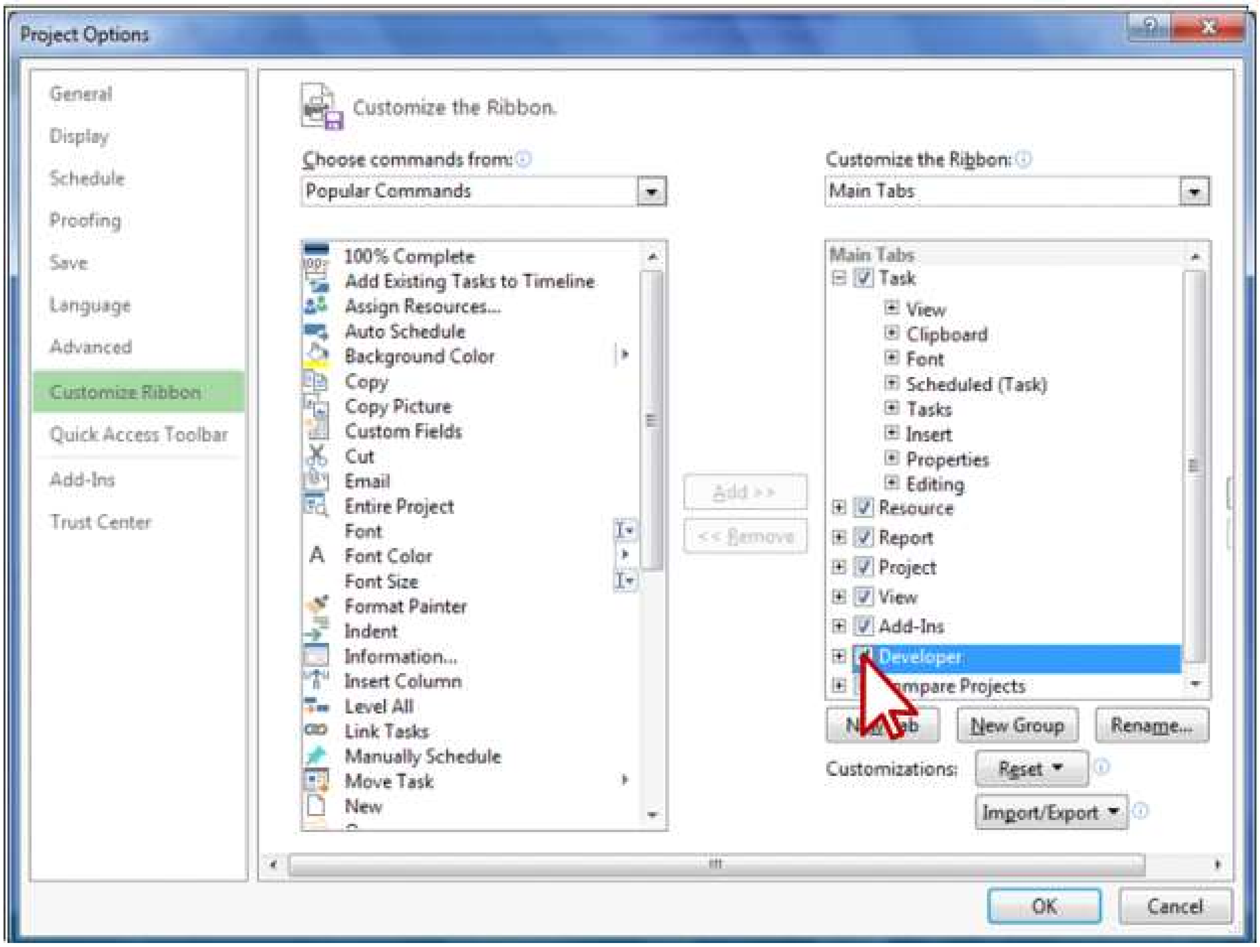
If there is no Developer Tab, it should be added by right-clicking on the ribbon bar and selecting (by clicking), **Customize the Ribbon** as shown in Figure 16 below. If the Developer Tab is already present, then this step should be skipped.



	ℹ	Task Name				redecessors	Resource Names
		Priority: (					
146		MATL I					
204		Depart					
608		Perch I					
		Priority: 500 - 599	4736d	Wed 2/11/09	Wed 4/7/27		
1	✓	Project Award/Start	1 day	Mon 11/2/09	Mon 11/2/09		
2		Project Completion	14 days	Fri 3/19/27	Wed 4/7/27	111,169,256,365	
4	▦	MATL	0 days	Wed 2/11/09	Wed 2/11/09		
6	▦	Transmission Line	0 days	Wed 2/11/09	Wed 2/11/09		
8	▦	MATL Land	0 days	Mon 11/2/09	Mon 11/2/09		
9	▦	MATL Land	0 days	Thu 12/22/11	Thu 12/22/11		
11	▦	MT Land	0 days	Mon 11/2/09	Mon 11/2/09		
12	▦	MT Land	0 days	Thu 12/22/11	Thu 12/22/11		
14	▦	MT RoW Consideration	0 days	Mon 11/2/09	Mon 11/2/09		
16	▦	Marias Sub to US/Cana	0 days	Mon 11/9/09	Mon 11/9/09		
17	▦	Marias Sub to US/Cana	0 days	Wed 11/17/10	Wed 11/17/10		
18	✓	Preliminary Access Stu	110 days	Mon 11/9/09	Fri 4/9/10	1	
19	✓	Montana Survey contro	14 days	Mon 11/9/09	Thu 11/26/09	1	
20	✓	Phase one Land Owne	20 days	Wed 3/17/10	Tue 4/13/10	18,19	
21	✓	Finalize Sales Catalog	39 days	Fri 1/15/10	Wed 3/10/10	19	

Figure 16, Customize the MS Project Ribbon

The Customize the Ribbon screen will then open. The **Developer** checkbox needs to be checked and the OK button clicked to add this tab it to the ribbon. This action is shown in Figure 17 below.



Project Options

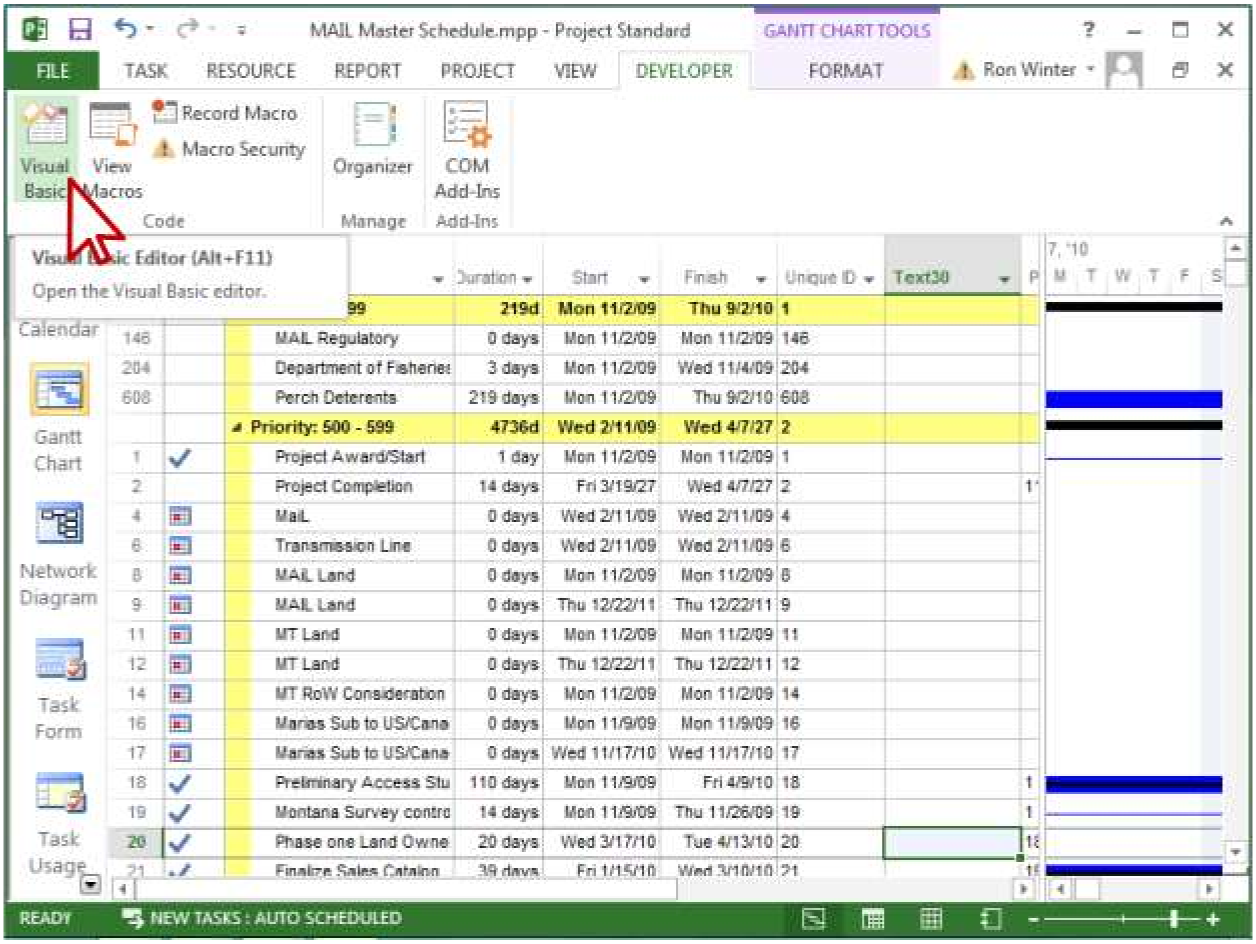
Customize the Ribbon.

Choose commands from: Popular Commands

Customize the Ribbon: Main Tabs

Figure 17, Select the Developer Tab

Now click on the **Developer** tab and then the Visual Basic button. This action is shown in Figure 18 below.



Visual Basic Editor (Alt+F11)

Open the Visual Basic editor.

			Duration	Start	Finish	Unique ID	Text30	P
		99	219d	Mon 11/2/09	Thu 9/2/10	1		
146		MAIL Regulatory	0 days	Mon 11/2/09	Mon 11/2/09	146		
204		Department of Fisheries	3 days	Mon 11/2/09	Wed 11/4/09	204		
608		Perch Deterents	219 days	Mon 11/2/09	Thu 9/2/10	608		
		Priority: 500 - 599	4736d	Wed 2/11/09	Wed 4/7/27	2		
1	✓	Project Award/Start	1 day	Mon 11/2/09	Mon 11/2/09	1		
2		Project Completion	14 days	Fri 3/19/27	Wed 4/7/27	2		1'
4	▦	MaiL	0 days	Wed 2/11/09	Wed 2/11/09	4		
6	▦	Transmission Line	0 days	Wed 2/11/09	Wed 2/11/09	6		
8	▦	MAIL Land	0 days	Mon 11/2/09	Mon 11/2/09	8		
9	▦	MAIL Land	0 days	Thu 12/22/11	Thu 12/22/11	9		
11	▦	MT Land	0 days	Mon 11/2/09	Mon 11/2/09	11		
12	▦	MT Land	0 days	Thu 12/22/11	Thu 12/22/11	12		
14	▦	MT RoW Consideration	0 days	Mon 11/2/09	Mon 11/2/09	14		
16	▦	Marias Sub to US/Cana	0 days	Mon 11/9/09	Mon 11/9/09	16		
17	▦	Marias Sub to US/Cana	0 days	Wed 11/17/10	Wed 11/17/10	17		
18	✓	Preliminary Access Stu	110 days	Mon 11/9/09	Fri 4/9/10	18		1
19	✓	Montana Survey contro	14 days	Mon 11/9/09	Thu 11/26/09	19		1
20	✓	Phase one Land Owne	20 days	Wed 3/17/10	Tue 4/13/10	20		1[illegible]
21	✓	Finalize Sales Catalog	39 days	Fri 1/15/10	Wed 3/10/10	21		1[illegible]

Figure 18, Open the Visual Basic Screen

The Global programming area now needs to be opened. Figure 17 shows that by clicking on the open tree symbol [+] in front of the **ProjectGlobal (Global.MPT)** line at the upper-left and then on the open tree symbol [+] on the **Microsoft Project Objects** folder that the **ThisProject (Global.MPT)** file is now revealed. The appropriate coding screen will open when the **ThisProject (Global.MPT)** file line is double-clicked. Once created, maximize the coding screen on the right. The screen should now look like that of Figure 19 below.

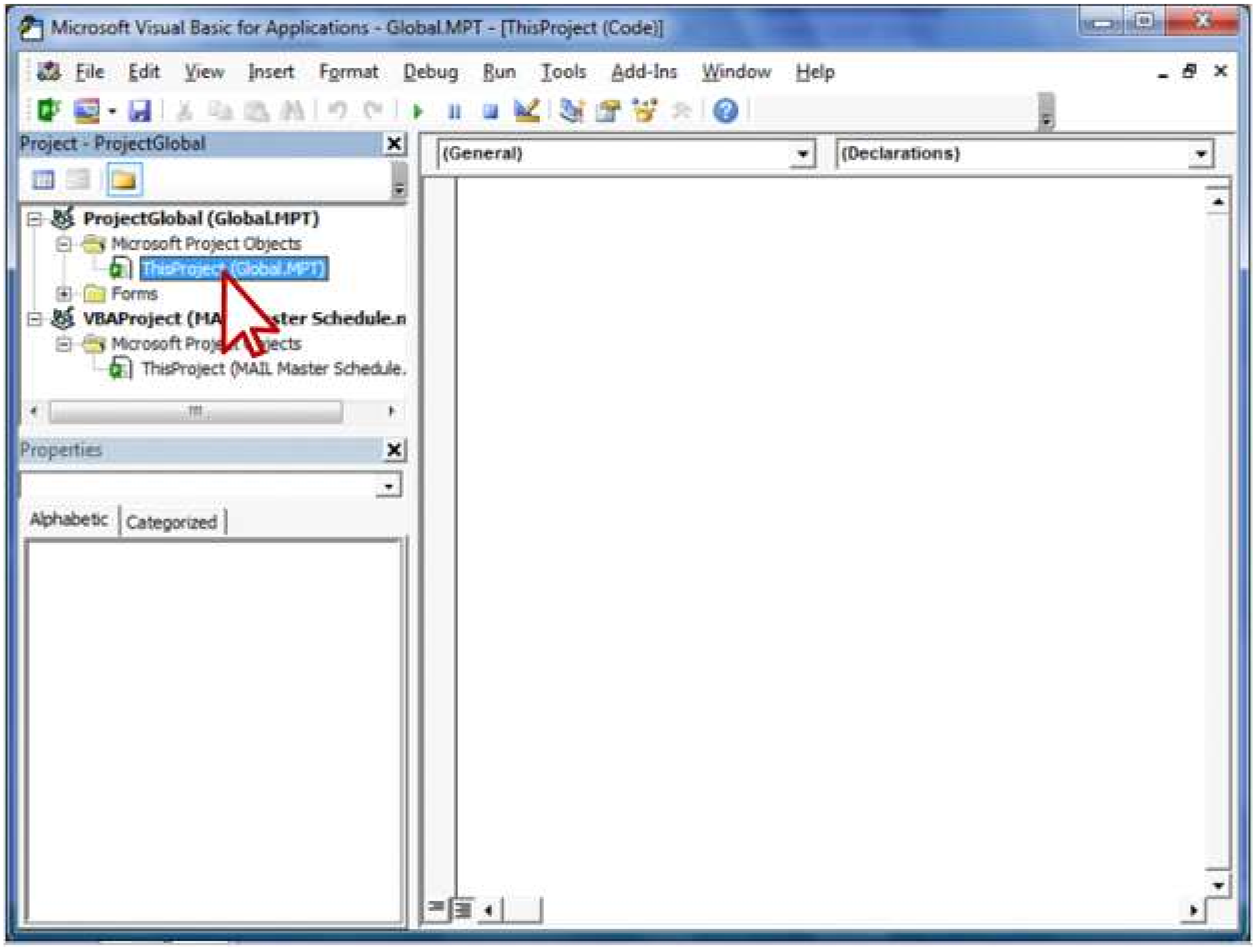

Microsoft Visual Basic for Applications - Global.MPT - [ThisProject (Code)]
File Edit View Insert Format Debug Run Tools Add-Ins Window Help
Project - ProjectGlobal
ProjectGlobal (Global.MPT)
Microsoft Project Objects
ThisProject (Global.MPT)
Forms
VBAProject (MA ster Schedule.n
Microsoft Proj ects
ThisProject (MAIL Master Schedule.
Properties
Alphabetic
Categorized
(General)
(Declarations)

Figure 19, VBA Coding Screen

The public domain software for reporting on out-of-sequence tasks and events must now be entered into the blank writing area on the right. This egregious task is vastly simplified by the fact that this code has already been written and is supplied free with this paper.

The entire program from Appendix B can be copied or one can request the text file from the author of this paper instead. To use the text file, the file **OOS_VBA_Code.txt** should be read using a word processor. The entire contents of the file should be placed on the Windows Clipboard using the functions, **Select All** and **Copy**. A right-click in the blank code screen and the clicking on the **Paste** command inserts the contents into the screen, as shown in Figure 20 below.

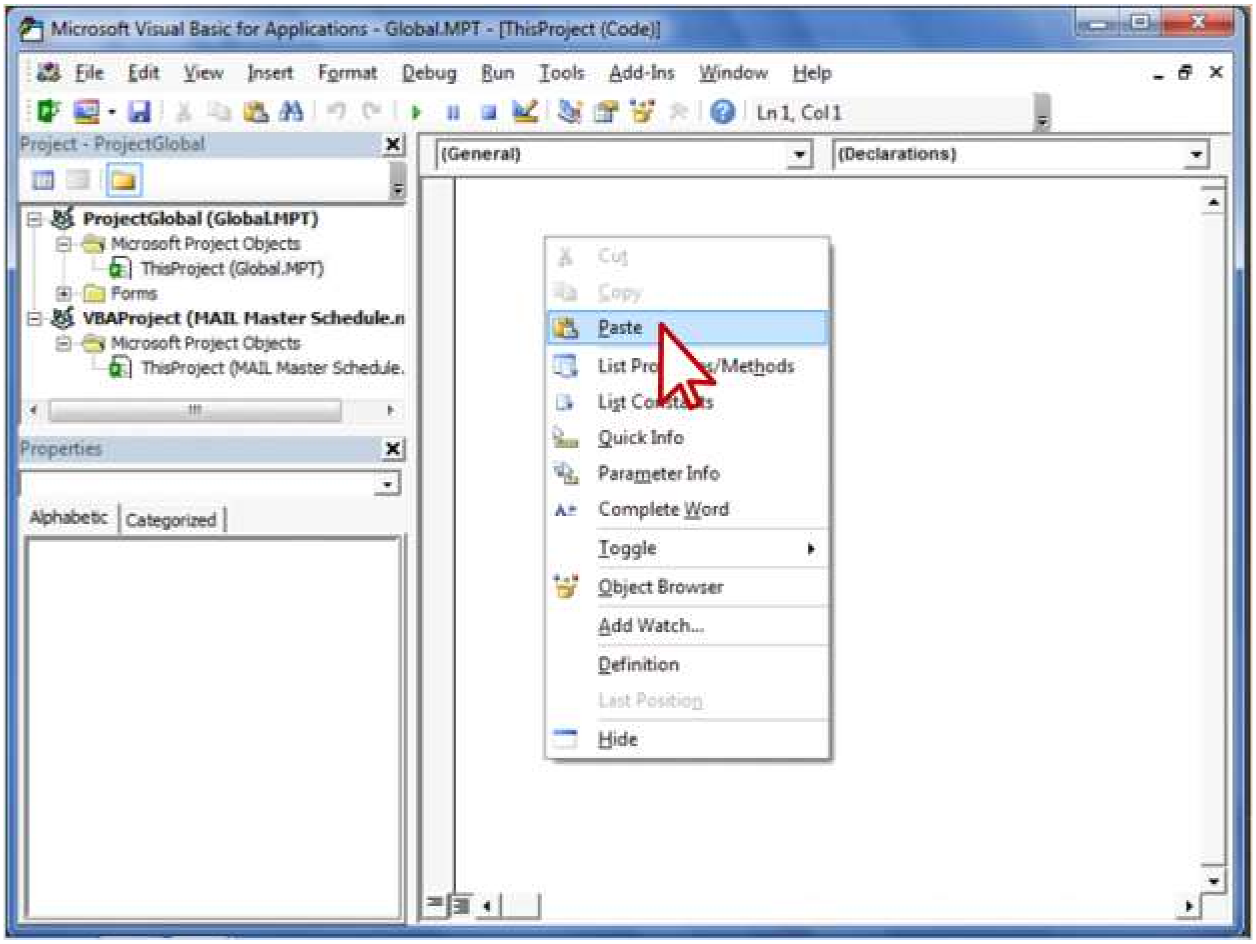
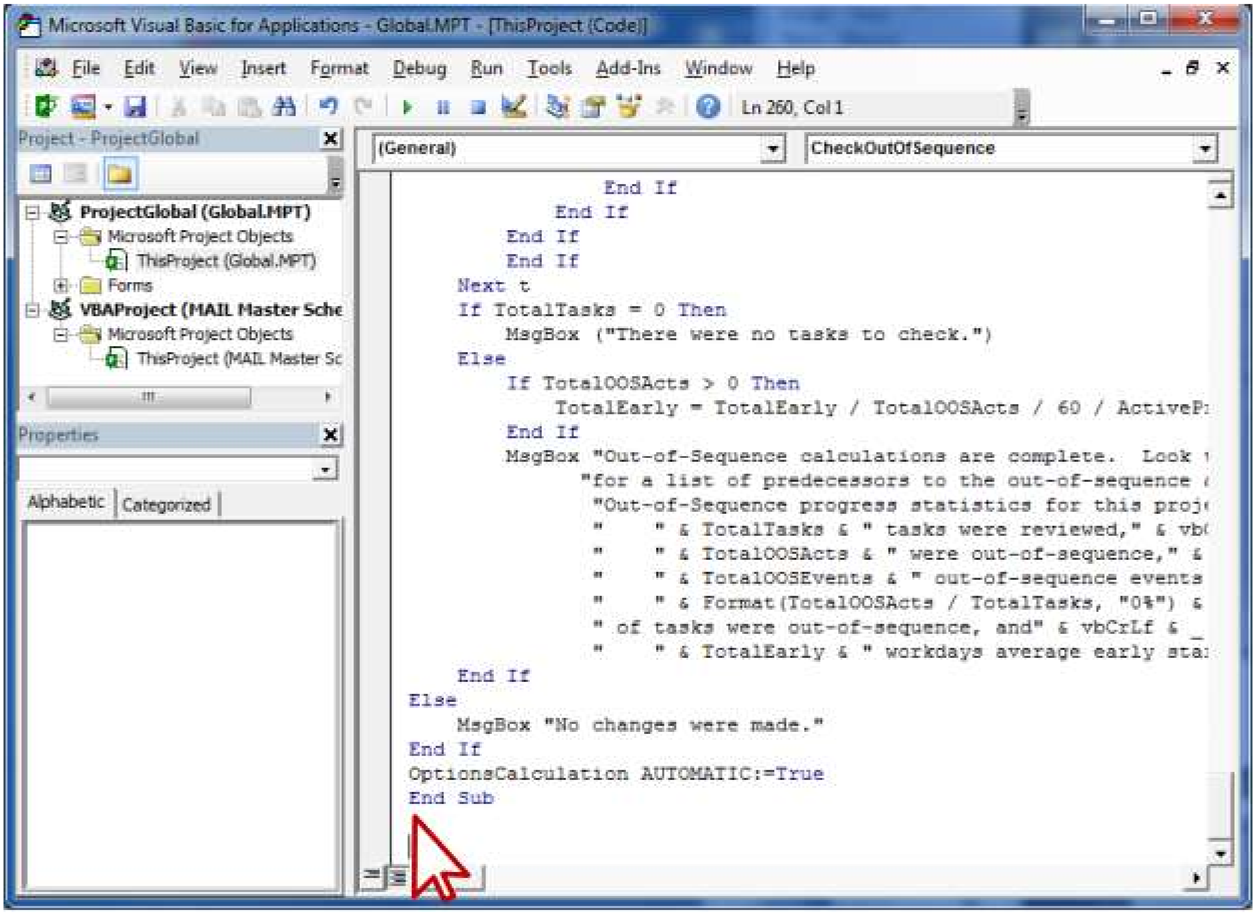


Figure 20, Paste Sample Code into Coding Screen

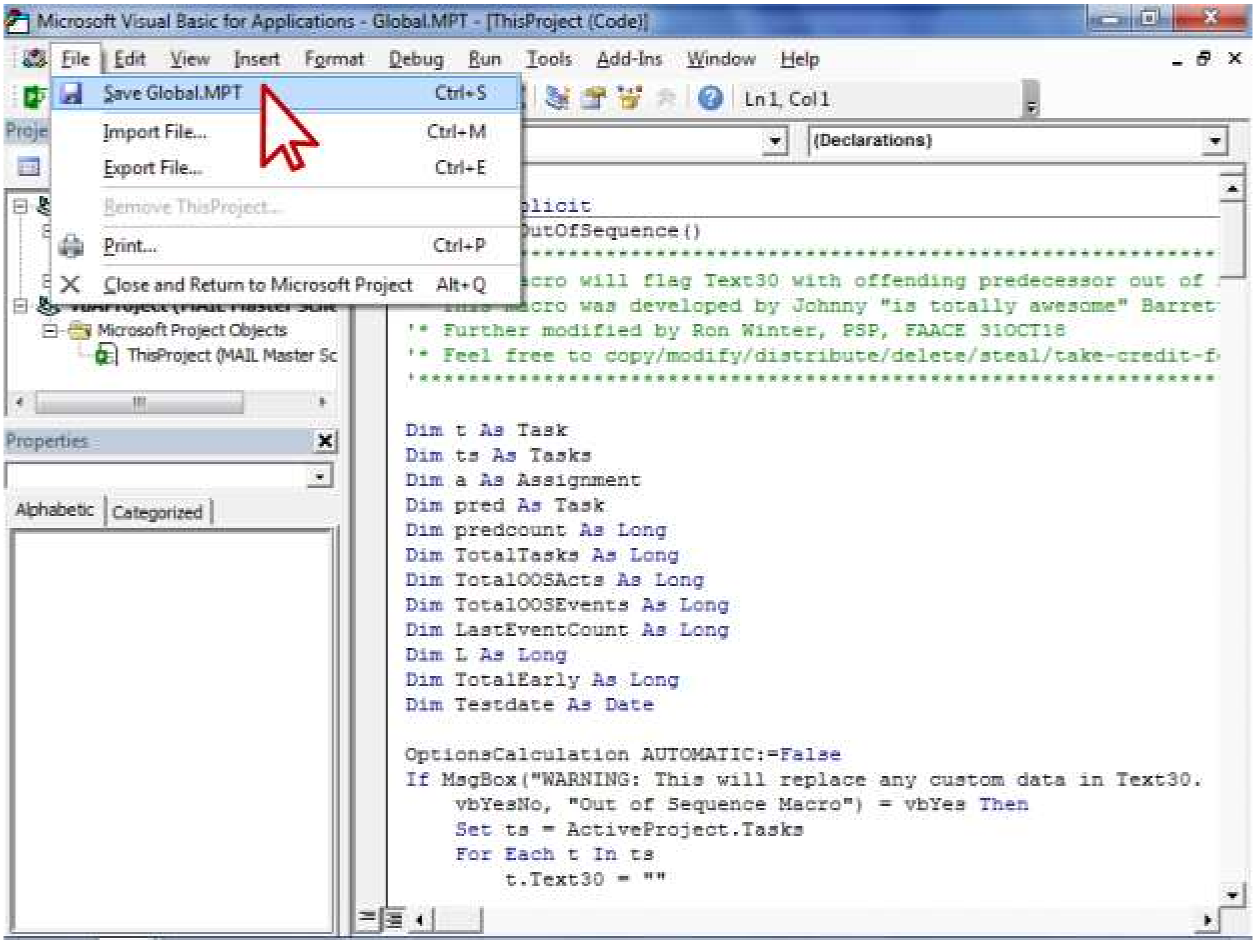
The text will be copied into the VBA coding area and the entry of the program is now complete. This software may be freely used and distributed as it is in the public domain and is not subject to any copyright restrictions. The end of the Reporting Out-of-Sequence VBA code is visible just after pasting it as shown in Figure 21 below.


Microsoft Visual Basic for Applications - Global.MPT - [ThisProject (Code)]
File
Edit
View
Insert
Format
Debug
Run
Tools
Add-Ins
Window
Help
Ln 260, Col 1
Project - ProjectGlobal
ProjectGlobal (Global.MPT)
Microsoft Project Objects
ThisProject (Global.MPT)
Forms
VBAProject (MAIL Master Sche
Microsoft Project Objects
ThisProject (MAIL Master Sc
Properties
Alphabetic
Categorized
(General)
CheckOutOfSequence

```
                End If
            End If
        End If
        End If
    Next t
    If TotalTasks = 0 Then
        MsgBox ("There were no tasks to check.")
    Else
        If TotalOOSActs > 0 Then
            TotalEarly = TotalEarly / TotalOOSActs / 60 / ActiveP
        End If
        MsgBox "Out-of-Sequence calculations are complete.  Look
              "for a list of predecessors to the out-of-sequence
               "Out-of-Sequence progress statistics for this proj
               "    " & TotalTasks & " tasks were reviewed," & vb
               "    " & TotalOOSActs & " were out-of-sequence," &
               "    " & TotalOOSEvents & " out-of-sequence events
               "    " & Format(TotalOOSActs / TotalTasks, "0%") &
               " of tasks were out-of-sequence, and" & vbCrLf & _
               "    " & TotalEarly & " workdays average early sta
    End If
Else
    MsgBox "No changes were made."
End If
OptionsCalculation AUTOMATIC:=True
End Sub
```

Figure 21, Sample Code Pasted into Coding Screen

The new code is saved by clicking on menu items, **File** / **Save** as shown in Figure 22. The entire process is complete when the VBA window is closed. The original Project Window will now return.



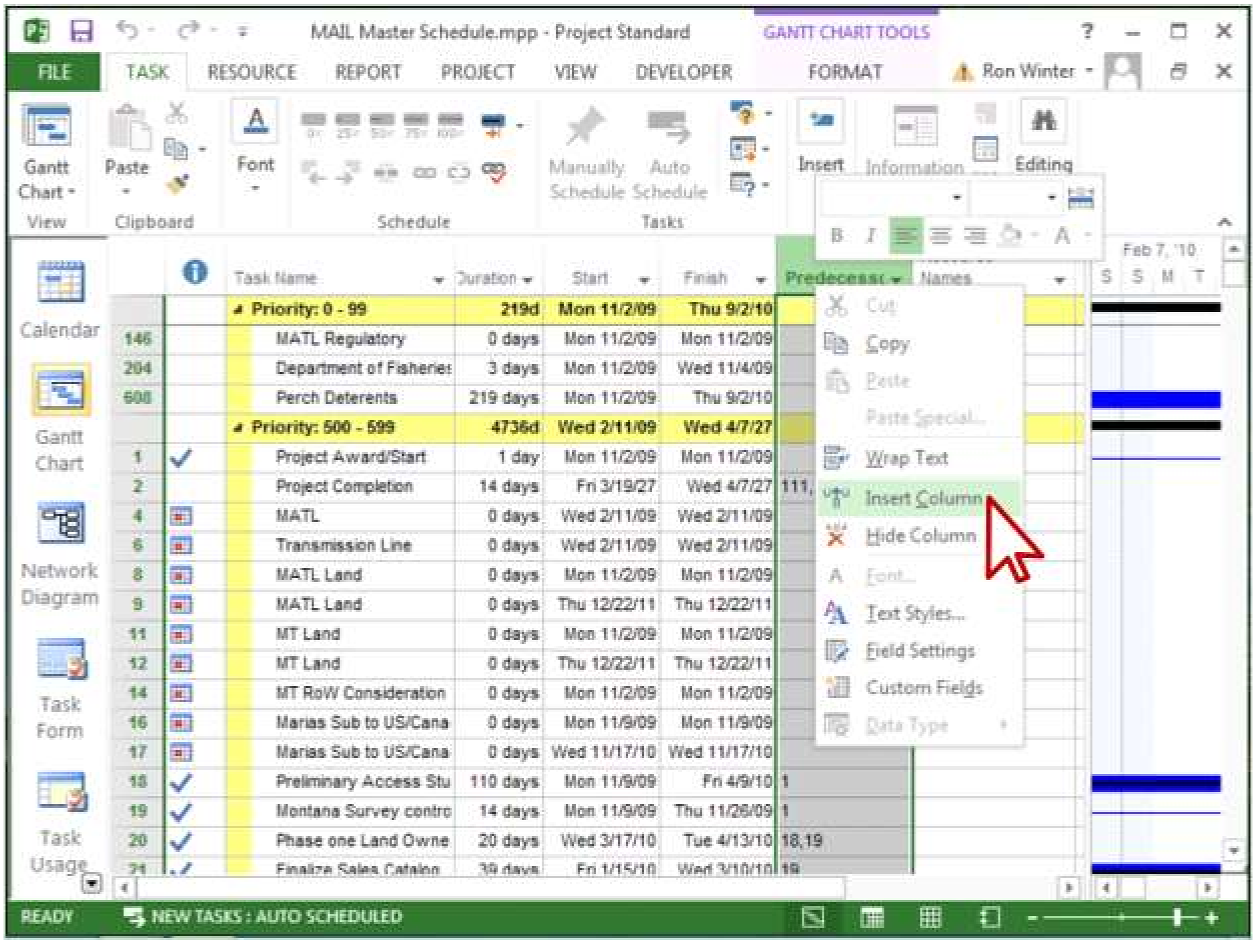
```
plicit
utOfSequence()
*************************************************************
cro will flag Text30 with offending predecessor out of
macro was developed by Johnny "is totally awesome" Barret
'* Further modified by Ron Winter, PSP, FAACE 31OCT18
'* Feel free to copy/modify/distribute/delete/steal/take-credit-f
'*************************************************************

Dim t As Task
Dim ts As Tasks
Dim a As Assignment
Dim pred As Task
Dim predcount As Long
Dim TotalTasks As Long
Dim TotalOOSActs As Long
Dim TotalOOSEvents As Long
Dim LastEventCount As Long
Dim L As Long
Dim TotalEarly As Long
Dim Testdate As Date

OptionsCalculation AUTOMATIC:=False
If MsgBox("WARNING: This will replace any custom data in Text30.
    vbYesNo, "Out of Sequence Macro") = vbYes Then
    Set ts = ActiveProject.Tasks
    For Each t In ts
        t.Text30 = ""
```

Figure 22, Save the Out-of-Sequence Program

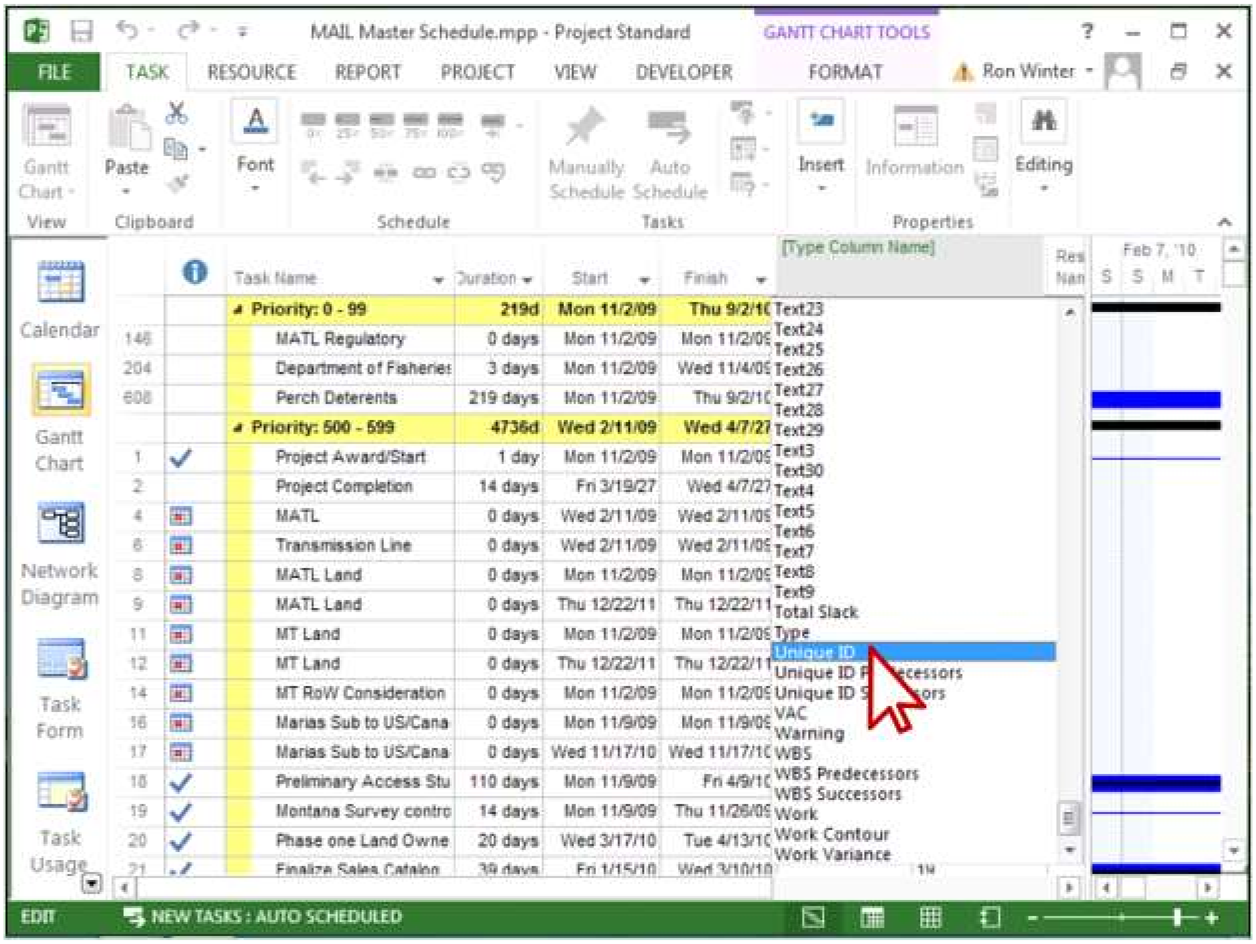
In order to display the information generated by this new code, two extra columns need to be added to the MS Project spreadsheet portion by right-clicking on the column header area and selecting **Insert Column** as shown in Figure 23 below.



		Task Name	Duration	Start	Finish	Predecessors	Names
		Priority: 0 - 99	219d	Mon 11/2/09	Thu 9/2/10		
146		MATL Regulatory	0 days	Mon 11/2/09	Mon 11/2/09		
204		Department of Fisheries	3 days	Mon 11/2/09	Wed 11/4/09		
600		Perch Deterents	219 days	Mon 11/2/09	Thu 9/2/10		
		Priority: 500 - 599	4736d	Wed 2/11/09	Wed 4/7/27		
1	✓	Project Award/Start	1 day	Mon 11/2/09	Mon 11/2/09		
2		Project Completion	14 days	Fri 3/19/27	Wed 4/7/27	111,	
4	▦	MATL	0 days	Wed 2/11/09	Wed 2/11/09		
6	▦	Transmission Line	0 days	Wed 2/11/09	Wed 2/11/09		
8	▦	MATL Land	0 days	Mon 11/2/09	Mon 11/2/09		
9	▦	MATL Land	0 days	Thu 12/22/11	Thu 12/22/11		
11	▦	MT Land	0 days	Mon 11/2/09	Mon 11/2/09		
12	▦	MT Land	0 days	Thu 12/22/11	Thu 12/22/11		
14	▦	MT RoW Consideration	0 days	Mon 11/2/09	Mon 11/2/09		
16	▦	Marias Sub to US/Cana	0 days	Mon 11/9/09	Mon 11/9/09		
17	▦	Marias Sub to US/Cana	0 days	Wed 11/17/10	Wed 11/17/10		
18	✓	Preliminary Access Stu	110 days	Mon 11/9/09	Fri 4/9/10	1	
19	✓	Montana Survey contro	14 days	Mon 11/9/09	Thu 11/26/09	1	
20	✓	Phase one Land Owne	20 days	Wed 3/17/10	Tue 4/13/10	18,19	
21	✓	Finalize Sales Catalog	39 days	Fri 1/15/10	Wed 3/10/10	19	

Figure 23, Add a New Column to MS Project

The column type, **Unique ID** must be selected, as shown in Figure 24 below.   All of the available columns are listed in alphabetical order, so this column is found by scrolling down to the end of the list to find the column types starting with a, U.

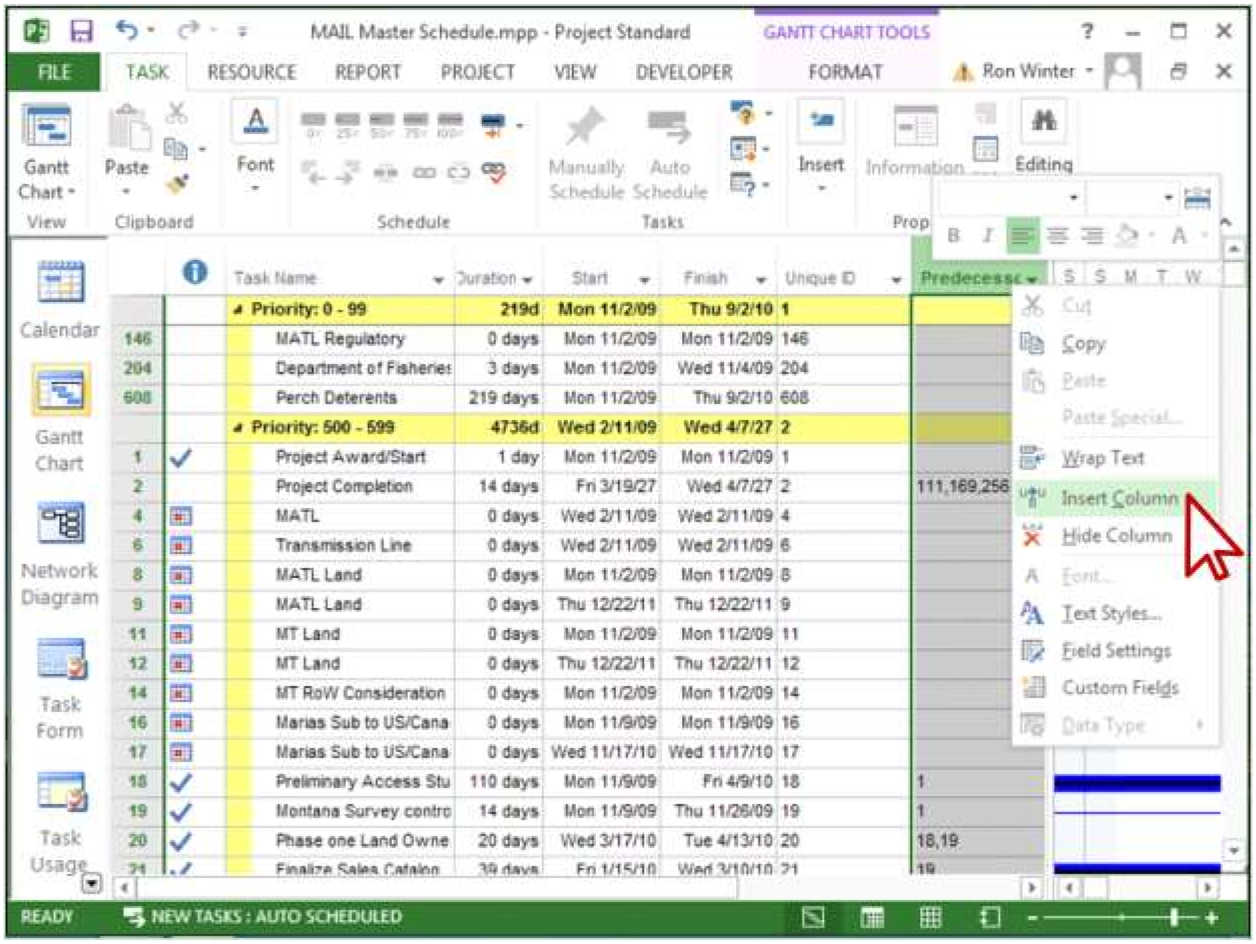


		Task Name	Duration	Start	Finish
		Priority: 0 - 99	219d	Mon 11/2/09	Thu 9/2/10
146		MATL Regulatory	0 days	Mon 11/2/09	Mon 11/2/09
204		Department of Fisheries	3 days	Mon 11/2/09	Wed 11/4/09
608		Perch Deterents	219 days	Mon 11/2/09	Thu 9/2/10
		Priority: 500 - 599	4736d	Wed 2/11/09	Wed 4/7/27
1	✓	Project Award/Start	1 day	Mon 11/2/09	Mon 11/2/09
2		Project Completion	14 days	Fri 3/19/27	Wed 4/7/27
4	▦	MATL	0 days	Wed 2/11/09	Wed 2/11/09
6	▦	Transmission Line	0 days	Wed 2/11/09	Wed 2/11/09
8	▦	MATL Land	0 days	Mon 11/2/09	Mon 11/2/09
9	▦	MATL Land	0 days	Thu 12/22/11	Thu 12/22/11
11	▦	MT Land	0 days	Mon 11/2/09	Mon 11/2/09
12	▦	MT Land	0 days	Thu 12/22/11	Thu 12/22/11
14	▦	MT RoW Consideration	0 days	Mon 11/2/09	Mon 11/2/09
16	▦	Marias Sub to US/Cana	0 days	Mon 11/9/09	Mon 11/9/09
17	▦	Marias Sub to US/Cana	0 days	Wed 11/17/10	Wed 11/17/10
18	✓	Preliminary Access Stu	110 days	Mon 11/9/09	Fri 4/9/10
19	✓	Montana Survey contro	14 days	Mon 11/9/09	Thu 11/26/09
20	✓	Phase one Land Owne	20 days	Wed 3/17/10	Tue 4/13/10
21	✓	Finalize Sales Catalog	39 days	Fri 1/15/10	Wed 3/10/10

Figure 24, Select the Unique ID Column

The Task ID numbers shown to the left of each task is a number that will change whenever the sorting type is changed. Another column called, Unique ID is a better choice for display as it is a Task ID number that never changes no matter how the tasks are sorted.

The second column to be added is where the new program stores the Unique Task IDs of the predecessors to the out-of-sequence activity. Right-clicking again on the column name section and selecting, **Insert Column** as shown in Figure 25 below, will begin this process.

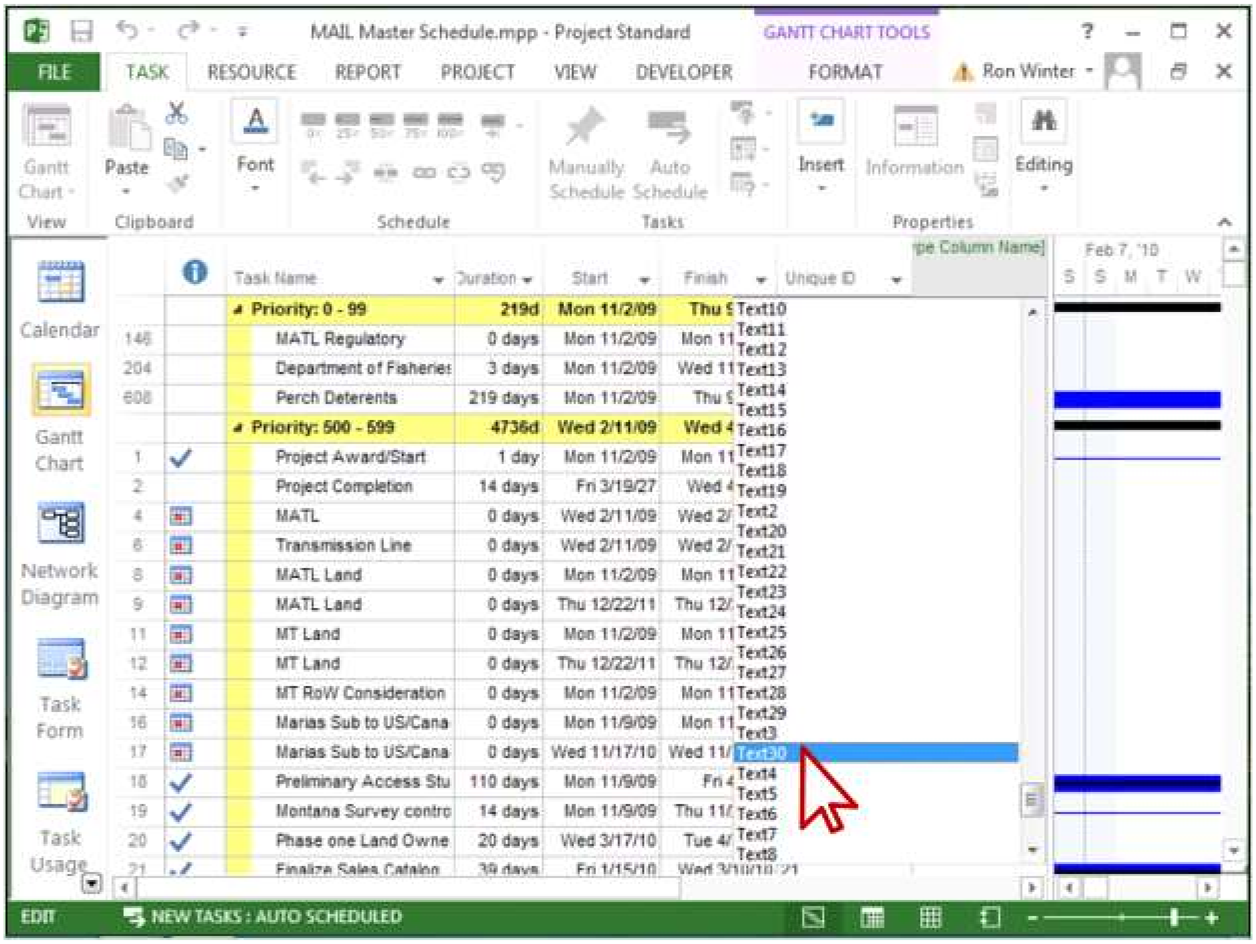


	ⓘ	Task Name	Duration	Start	Finish	Unique ID	Predecessc
		Priority: 0 - 99	219d	Mon 11/2/09	Thu 9/2/10	1	
146		MATL Regulatory	0 days	Mon 11/2/09	Mon 11/2/09	146	
204		Department of Fisheries	3 days	Mon 11/2/09	Wed 11/4/09	204	
608		Perch Deterents	219 days	Mon 11/2/09	Thu 9/2/10	608	
		Priority: 500 - 599	4736d	Wed 2/11/09	Wed 4/7/27	2	
1	✓	Project Award/Start	1 day	Mon 11/2/09	Mon 11/2/09	1	
2		Project Completion	14 days	Fri 3/19/27	Wed 4/7/27	2	111,169,256
4	▦	MATL	0 days	Wed 2/11/09	Wed 2/11/09	4	
6	▦	Transmission Line	0 days	Wed 2/11/09	Wed 2/11/09	6	
8	▦	MATL Land	0 days	Mon 11/2/09	Mon 11/2/09	8	
9	▦	MATL Land	0 days	Thu 12/22/11	Thu 12/22/11	9	
11	▦	MT Land	0 days	Mon 11/2/09	Mon 11/2/09	11	
12	▦	MT Land	0 days	Thu 12/22/11	Thu 12/22/11	12	
14	▦	MT RoW Consideration	0 days	Mon 11/2/09	Mon 11/2/09	14	
16	▦	Marias Sub to US/Cana	0 days	Mon 11/9/09	Mon 11/9/09	16	
17	▦	Marias Sub to US/Cana	0 days	Wed 11/17/10	Wed 11/17/10	17	
18	✓	Preliminary Access Stu	110 days	Mon 11/9/09	Fri 4/9/10	18	1
19	✓	Montana Survey contro	14 days	Mon 11/9/09	Thu 11/26/09	19	1
20	✓	Phase one Land Owne	20 days	Wed 3/17/10	Tue 4/13/10	20	18,19
21	✓	Finalize Sales Catalog	39 days	Fri 1/15/10	Wed 3/10/10	21	19

Figure 25, Add a Second New Column

The resulting list contains the entry, **Text30**, as shown in Figure 26. The new column will display the predecessor Unique ID information, as identified by the new program. This column is the last undefined user-text column and is most likely to not being used by a different application.

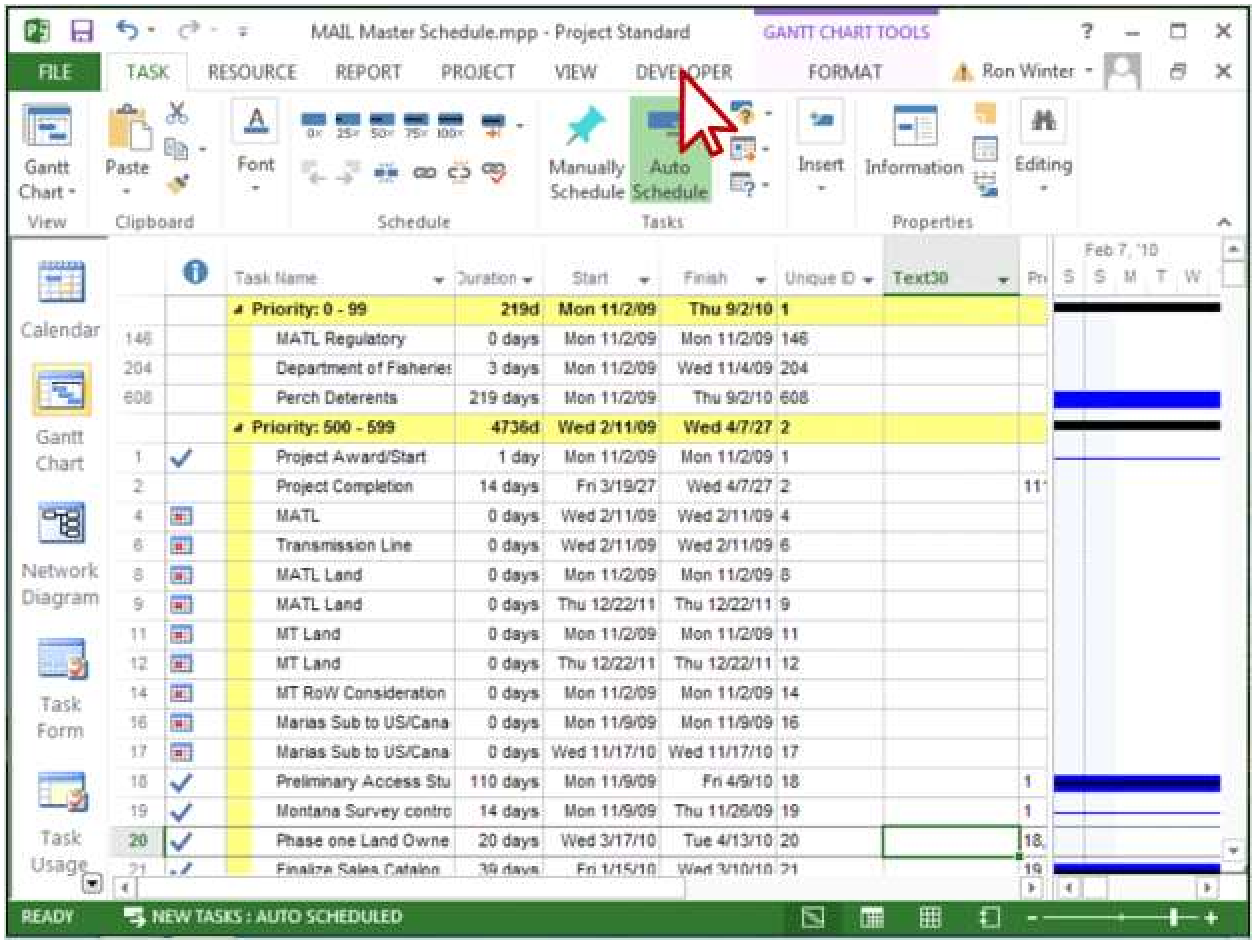
There will be a problem if the Text30 column is already dedicated to a different function. A different, unused text column will need to be selected and then all references to Text30 in the VBA code will need to be modified. This is not a trivial effort, as this conversion can prove to be an extensive amount of programming work.



		Task Name	Duration	Start	Finish	Unique ID
		Priority: 0 - 99	219d	Mon 11/2/09	Thu 9	
148		MATL Regulatory	0 days	Mon 11/2/09	Mon 11	
204		Department of Fisheries	3 days	Mon 11/2/09	Wed 11	
608		Perch Deterents	219 days	Mon 11/2/09	Thu 9	
		Priority: 500 - 599	4736d	Wed 2/11/09	Wed 4	
1	✓	Project Award/Start	1 day	Mon 11/2/09	Mon 11	
2		Project Completion	14 days	Fri 3/19/27	Wed 4	
4		MATL	0 days	Wed 2/11/09	Wed 2/	
6		Transmission Line	0 days	Wed 2/11/09	Wed 2/	
8		MATL Land	0 days	Mon 11/2/09	Mon 11	
9		MATL Land	0 days	Thu 12/22/11	Thu 12/	
11		MT Land	0 days	Mon 11/2/09	Mon 11	
12		MT Land	0 days	Thu 12/22/11	Thu 12/	
14		MT RoW Consideration	0 days	Mon 11/2/09	Mon 11	
16		Marias Sub to US/Cana	0 days	Mon 11/9/09	Mon 11	
17		Marias Sub to US/Cana	0 days	Wed 11/17/10	Wed 11/	
18	✓	Preliminary Access Stu	110 days	Mon 11/9/09	Fri 4	
19	✓	Montana Survey contro	14 days	Mon 11/9/09	Thu 11/	
20	✓	Phase one Land Owne	20 days	Wed 3/17/10	Tue 4/	
21	✓	Finalize Sales Catalog	39 days	Fri 1/15/10	Wed 3/10/10	21

Figure 26, Select Text30 as the Second New Column

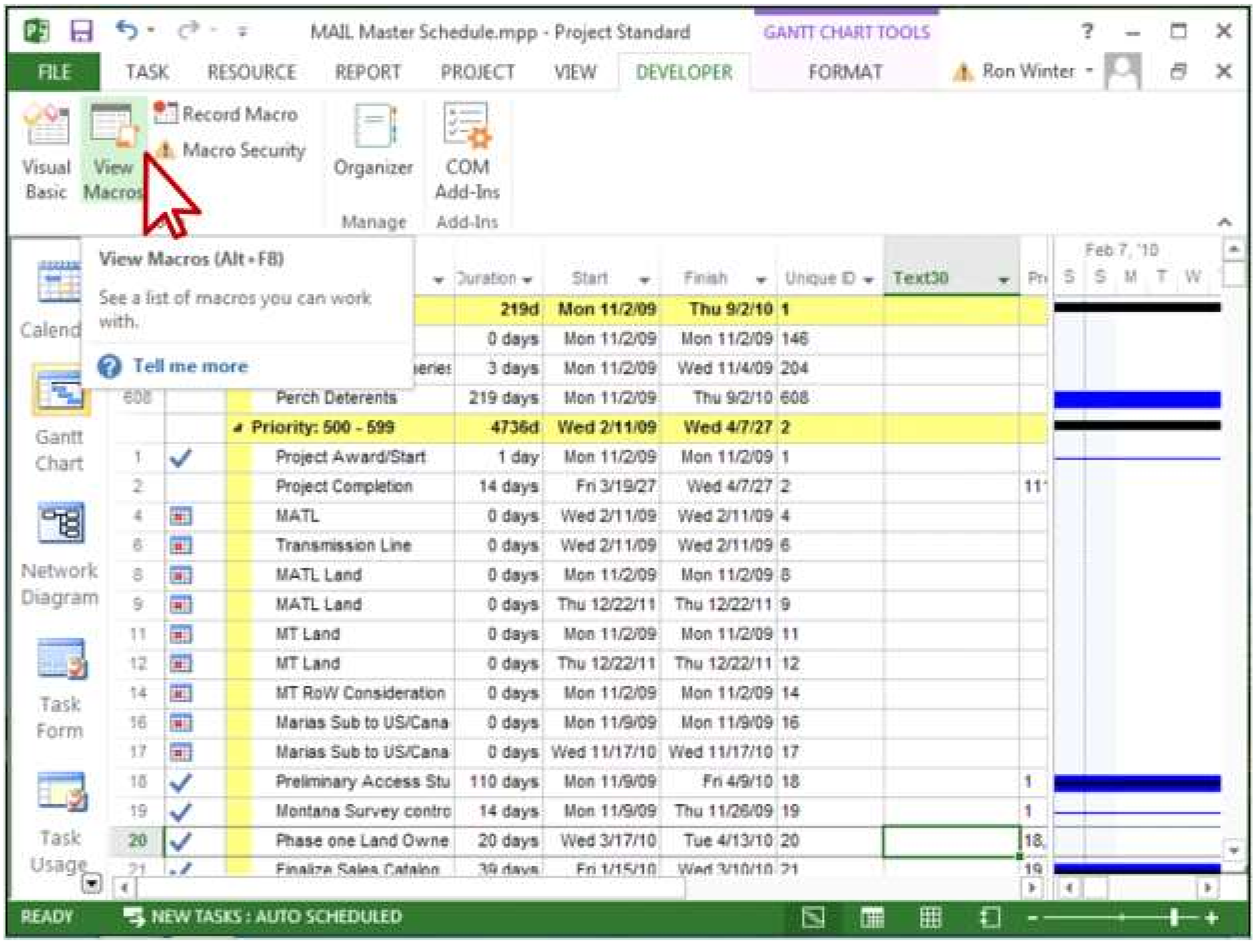
Now the new macro is ready to be run. Because the program is stored in the global area, this new function will be available in MS Project no matter what CPM schedule is being viewed. The first step in running the out-of-sequence reporting program is to click on the Developer Tab as shown in Figure 27 below.



	ⓘ	Task Name	Duration	Start	Finish	Unique ID	Text30	Pr
		Priority: 0 - 99	**219d**	**Mon 11/2/09**	**Thu 9/2/10**	**1**		
146		MATL Regulatory	0 days	Mon 11/2/09	Mon 11/2/09	146		
204		Department of Fisheries	3 days	Mon 11/2/09	Wed 11/4/09	204		
608		Perch Deterents	219 days	Mon 11/2/09	Thu 9/2/10	608		
		Priority: 500 - 599	**4736d**	**Wed 2/11/09**	**Wed 4/7/27**	**2**		
1	✓	Project Award/Start	1 day	Mon 11/2/09	Mon 11/2/09	1		
2		Project Completion	14 days	Fri 3/19/27	Wed 4/7/27	2		11
4	▦	MATL	0 days	Wed 2/11/09	Wed 2/11/09	4		
6	▦	Transmission Line	0 days	Wed 2/11/09	Wed 2/11/09	6		
8	▦	MATL Land	0 days	Mon 11/2/09	Mon 11/2/09	8		
9	▦	MATL Land	0 days	Thu 12/22/11	Thu 12/22/11	9		
11	▦	MT Land	0 days	Mon 11/2/09	Mon 11/2/09	11		
12	▦	MT Land	0 days	Thu 12/22/11	Thu 12/22/11	12		
14	▦	MT RoW Consideration	0 days	Mon 11/2/09	Mon 11/2/09	14		
16	▦	Marias Sub to US/Cana	0 days	Mon 11/9/09	Mon 11/9/09	16		
17	▦	Marias Sub to US/Cana	0 days	Wed 11/17/10	Wed 11/17/10	17		
18	✓	Preliminary Access Stu	110 days	Mon 11/9/09	Fri 4/9/10	18		1
19	✓	Montana Survey contro	14 days	Mon 11/9/09	Thu 11/26/09	19		1
20	✓	Phase one Land Owne	20 days	Wed 3/17/10	Tue 4/13/10	20		18,
21	✓	Finalize Sales Catalog	39 days	Fri 1/15/10	Wed 3/10/10	21		19

Figure 27, Select the Developer Tab

The second step requires clicking on the **View Macros** function in the Developer part of the ribbon as shown in Figure 28. In general, the words VBA macros, code, and scripts all mean the same thing.



View Macros (Alt+F8)

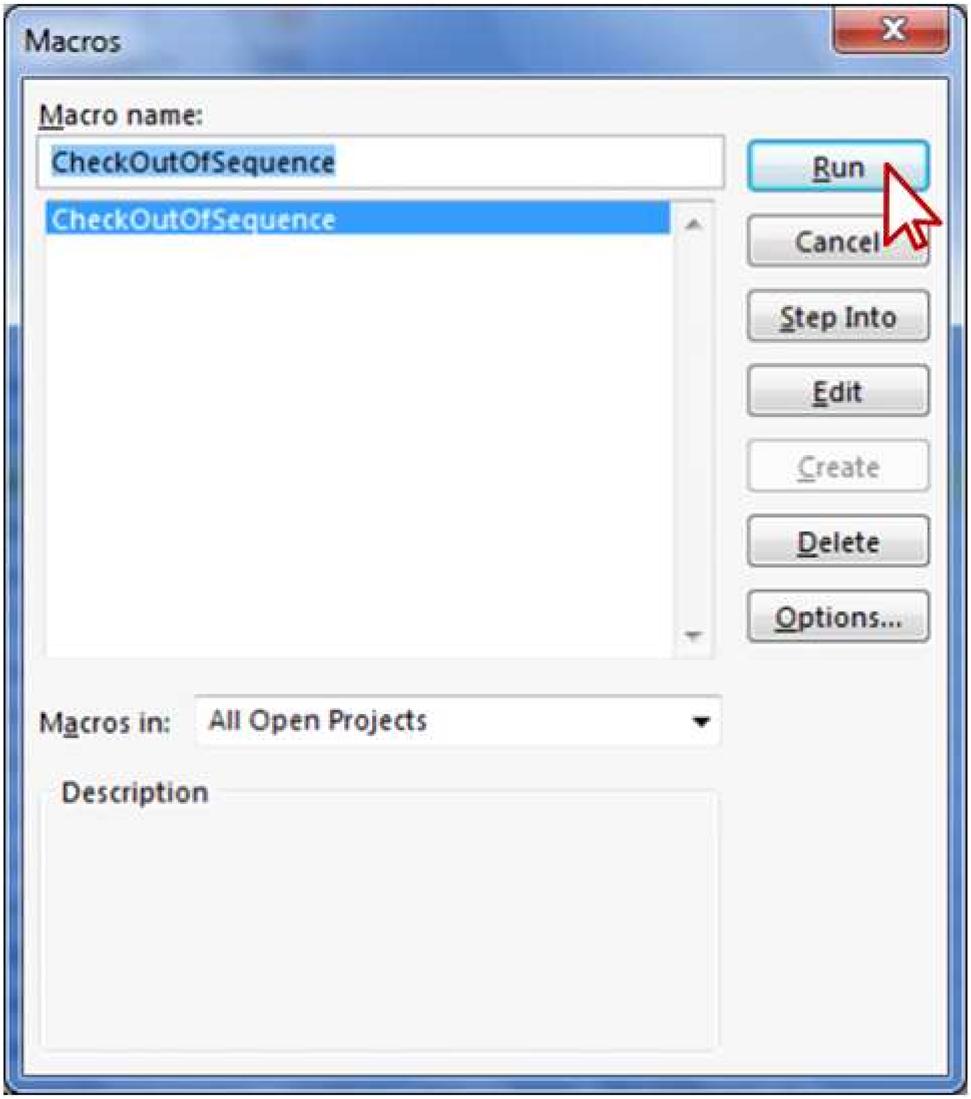
See a list of macros you can work with.

Tell me more

			Duration	Start	Finish	Unique ID	Text30	Pr
			219d	Mon 11/2/09	Thu 9/2/10	1		
			0 days	Mon 11/2/09	Mon 11/2/09	146		
		eries	3 days	Mon 11/2/09	Wed 11/4/09	204		
608		Perch Deterents	219 days	Mon 11/2/09	Thu 9/2/10	608		
		Priority: 500 - 599	4736d	Wed 2/11/09	Wed 4/7/27	2		
1	✓	Project Award/Start	1 day	Mon 11/2/09	Mon 11/2/09	1		
2		Project Completion	14 days	Fri 3/19/27	Wed 4/7/27	2		11
4	▦	MATL	0 days	Wed 2/11/09	Wed 2/11/09	4		
6	▦	Transmission Line	0 days	Wed 2/11/09	Wed 2/11/09	6		
8	▦	MATL Land	0 days	Mon 11/2/09	Mon 11/2/09	8		
9	▦	MATL Land	0 days	Thu 12/22/11	Thu 12/22/11	9		
11	▦	MT Land	0 days	Mon 11/2/09	Mon 11/2/09	11		
12	▦	MT Land	0 days	Thu 12/22/11	Thu 12/22/11	12		
14	▦	MT RoW Consideration	0 days	Mon 11/2/09	Mon 11/2/09	14		
16	▦	Marias Sub to US/Cana	0 days	Mon 11/9/09	Mon 11/9/09	16		
17	▦	Marias Sub to US/Cana	0 days	Wed 11/17/10	Wed 11/17/10	17		
18	✓	Preliminary Access Stu	110 days	Mon 11/9/09	Fri 4/9/10	18		1
19	✓	Montana Survey contro	14 days	Mon 11/9/09	Thu 11/26/09	19		1
20	✓	Phase one Land Owne	20 days	Wed 3/17/10	Tue 4/13/10	20		18,
21	✓	Finalize Sales Catalog	39 days	Fri 1/15/10	Wed 3/10/10	21		19

Figure 28, Open the View Macros Window

The macro with the name, **CheckOutOfSequence**, will be displayed as in Figure 29 below. Clicking on that line and then the Run Button will start the program running.



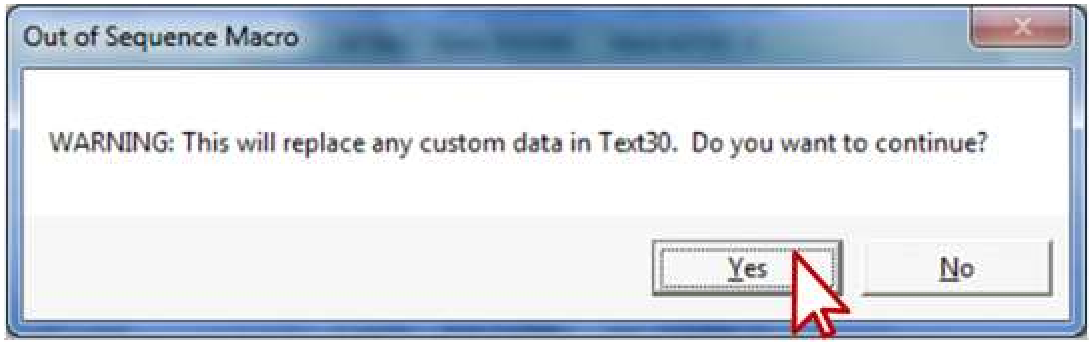
Macro name: CheckOutOfSequence

CheckOutOfSequence

Macros in: All Open Projects

Figure 29, Run the CheckOutOfSequence Macro

The new out-of-sequence reporting function starts by displaying a warning that running this macro will erase anything already in the Text30 field. This warning is shown below in Figure 30. The warning is to be expected and is part of the program. If the macro was activated inadvertently, then this is the time to 'chicken-out' and click on the **No** button.

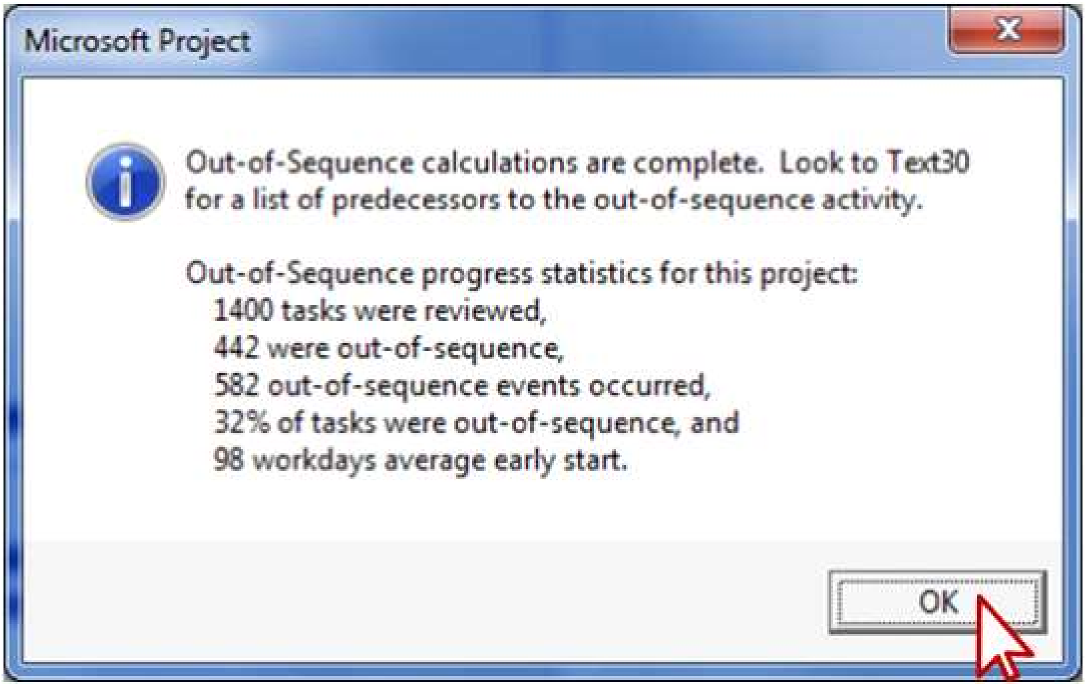

Out of Sequence Macro

WARNING: This will replace any custom data in Text30. Do you want to continue?

Figure 30, Last Chance to Chicken-Out

Clicking on the Yes button will cause the macro to proceed. The results window will then be displayed as in the example shown in Figure 31 below. The statistics displayed will reflect the current schedule and will most likely be different from what is shown here.

The example below is saying that of the 1400 tasks that have started (there may be more unstarted ones not reviewed), 442 of them were started out-of-sequence. This works out to be 32% to the total (rounded to the nearest whole percentage). 582 relationships were 'broken', or counted as events. The average number of days the out-of-sequence activities started before logically being allowed is 98 working days.

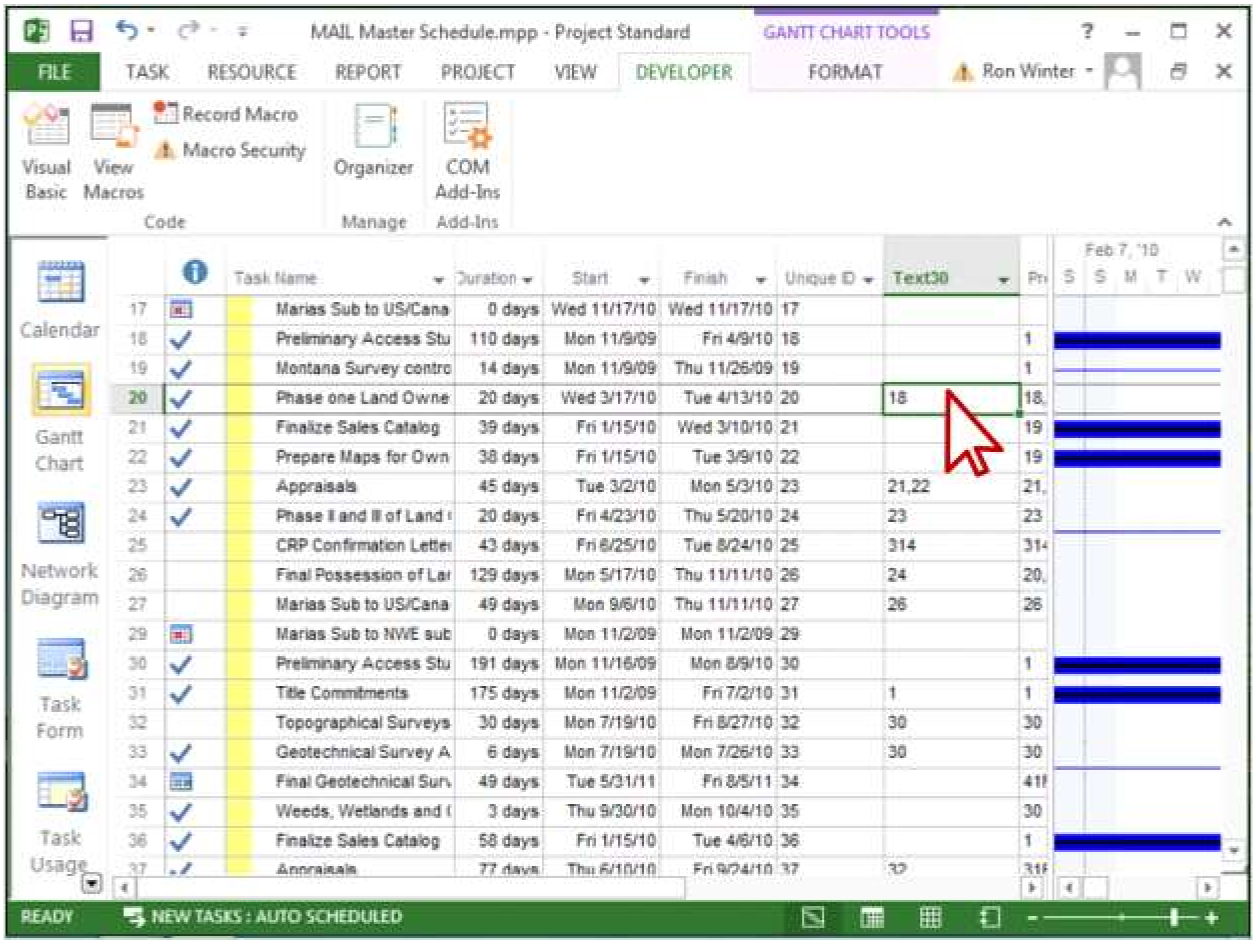

Microsoft Project

Out-of-Sequence calculations are complete. Look to Text30 for a list of predecessors to the out-of-sequence activity.

Out-of-Sequence progress statistics for this project:
1400 tasks were reviewed,
442 were out-of-sequence,
582 out-of-sequence events occurred,
32% of tasks were out-of-sequence, and
98 workdays average early start.

Figure 31, Completion of Out-of-Sequence Macro with Statistics

Clicking on the OK button will close the Statistics window. All of the ‘broken’ relationship links or events are now available for review. The Text30 field will contain the Unique IDs of any predecessors if that task started out-of-sequence. An example of a sample run is shown in Figure 32 below. Any Text30 field with an entry contains the Unique IDs of out-of-sequence predecessor tasks.



	ⓘ	Task Name	Duration	Start	Finish	Unique ID	Text30	Pr
17		Marias Sub to US/Cana	0 days	Wed 11/17/10	Wed 11/17/10	17		
18	✓	Preliminary Access Stu	110 days	Mon 11/9/09	Fri 4/9/10	18		1
19	✓	Montana Survey contro	14 days	Mon 11/9/09	Thu 11/26/09	19		1
20	✓	Phase one Land Owne	20 days	Wed 3/17/10	Tue 4/13/10	20	18	18,
21	✓	Finalize Sales Catalog	39 days	Fri 1/15/10	Wed 3/10/10	21		19
22	✓	Prepare Maps for Own	38 days	Fri 1/15/10	Tue 3/9/10	22		19
23	✓	Appraisals	45 days	Tue 3/2/10	Mon 5/3/10	23	21,22	21,
24	✓	Phase II and III of Land	20 days	Fri 4/23/10	Thu 5/20/10	24	23	23
25		CRP Confirmation Lette	43 days	Fri 6/25/10	Tue 8/24/10	25	314	314
26		Final Possession of Lar	129 days	Mon 5/17/10	Thu 11/11/10	26	24	20,
27		Marias Sub to US/Cana	49 days	Mon 9/6/10	Thu 11/11/10	27	26	26
29		Marias Sub to NWE sub	0 days	Mon 11/2/09	Mon 11/2/09	29		
30	✓	Preliminary Access Stu	191 days	Mon 11/16/09	Mon 8/9/10	30		1
31	✓	Title Commitments	175 days	Mon 11/2/09	Fri 7/2/10	31	1	1
32		Topographical Surveys	30 days	Mon 7/19/10	Fri 8/27/10	32	30	30
33	✓	Geotechnical Survey A	6 days	Mon 7/19/10	Mon 7/26/10	33	30	30
34		Final Geotechnical Sur	49 days	Tue 5/31/11	Fri 8/5/11	34		41F
35	✓	Weeds, Wetlands and	3 days	Thu 9/30/10	Mon 10/4/10	35		30
36	✓	Finalize Sales Catalog	58 days	Fri 1/15/10	Tue 4/6/10	36		1
37	✓	Appraisals	77 days	Thu 6/10/10	Fri 9/24/10	37	32	31F

Figure 32, New Text30 Column with Out-of-Sequence Predecessors

In the example above, Unique Task ID #20, **Phase One Land Owner** … started out-of-sequence to Unique Task #18, **Primary Access Sta** … as listed two tasks above this one. Viewing three tasks down from Unique Task #18, shows that Unique Task #23 started out-of-sequence to two different tasks; #21 and #22. Any task line without an entry in the Text30 field has no out-of-sequence predecessors.

Performing and saving the above processes will permanently add out-of-sequence reporting to all MS Project schedules viewed on that computer. The View Macros ribbon function can be used to activate it.

Conclusion

There are two types of out-of-sequence activities; direct and indirect out-of-sequence. Very few activities may be of both types to different activities, but when this occurs, the standard is to classify them as direct out-of-sequence to avoid double-counting.

A second operational consideration is whether the predecessor to the out-of-sequence activity is still active or if it has been completed. This is called active versus inactive out-of-sequence. Active out-of-sequence activities exhibit the retained logic restart work delay until the predecessor is complete. Some experts recommend that the logic should be adjusted to accommodate this condition. Once an activity becomes inactive, this guidance is no longer pertinent to planned work.

Further studies have refined the classification of out-of-sequence statistics in the global practice. According to the studies referenced herein, out-of-sequence activities have an average early start of 61 days and occur an average of 41% of the time.

This refinement also updates the two benchmarks for using out-of-sequence statistics to judge the quality of project planning and execution. Schedules showing average early out-of-sequence starts of greater than 93 work days are considered out of the standard practice. Likewise, schedules with out-of-sequence occurring in greater than 58% of the started activities would be outside of the industry standard.

The ability to report and filter upon total float settings can be of great help in disruption analyses. The problem is that most historical activities no longer show useable float values. The solution is to reference the activity's float in the appropriate baseline schedule and include this value in the out-of-sequence report.

Analyzing out-of-sequence daily profile charts can be confusing. One new technique presented here is to reference the daily ratio of out-of-sequence activities to all active activities for each day. This technique also applies to the daily ratio of out-of-sequence events to the number of daily out-of-sequence activities.

Finally, this paper demonstrates step-by-step instructions for using Visual Basic for Applications to implement out-of-sequence reporting in MS Project schedules. An extensive public domain script is provided to permit any scheduler to accurately report on out-of-sequence conditions in a MS Project schedule.

References

1. PS-2127, CPM Really Gets Interesting When You Consider Activity Status, Ron Winter, PSP FAACE, AACE Annual Meeting, 2016
2. PS-3006, Reporting on Out-of-Sequence Progress, Ron Winter, PSP FAACE, AACE Annual Meeting, 2018
3. PS-3007, Analyzing Out-of-Sequence Progress, Ron Winter, PSP FAACE, AACE Annual Meeting, 2018
4. Recommended Practice 10S-90, Cost Engineering Terminology, AACE International, October 31, 2017
5. Total Cost Management Framework, Section 10.1.2.3 Project Performance Assessment-Assess Schedule Performance, 2006
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Appendix A – Expanded and Complete Statistical Review

Schedule Name	Started Acts	Ave Early (WD)	Direct Events	Direct Acts	Indirect Events	Indirect Acts	Total Events	Total Acts	% Acts OOS	Events /OOS
0009	123	5	25	23	0	0	25	23	19%	1.09
0354	10109	65	4843	4122	1046	230	5889	4352	43%	1.35
0575	161	35	41	35	3	1	44	36	22%	1.22
0755	1380	56	934	763	475	85	1409	848	61%	1.66
0813	745	217	454	351	412	70	866	421	57%	2.06
1027	181	100	150	102	123	19	273	121	67%	2.26
1134	2612	34	1126	874	231	57	1357	931	36%	1.46
1500	3881	37	1517	1167	177	73	1694	1240	32%	1.37
2827	4594	159	2005	1392	641	143	2646	1535	33%	1.72
3332	612	26	221	203	146	34	367	237	39%	1.55
6800	353	9	55	54	12	60	67	114	32%	0.59
7031	435	13	193	167	49	10	242	177	41%	1.37
2W52	2549	139	1955	1259	521	92	2476	1351	53%	1.83
A031	494	42	186	140	140	40	326	180	36%	1.81
B114	2726	101	478	436	26	13	504	449	16%	1.12
BT29	875	126	386	322	151	37	537	359	41%	1.50
C000	65	29	14	10	1	0	15	10	15%	1.50
CHOP	6451	75	4607	3124	1129	119	5736	3243	50%	1.77
COUR	4552	47	1364	1098	1293	670	2657	1768	39%	1.50
CPWT	1004	118	520	392	218	63	738	455	45%	1.62
CU38	7430	47	3004	2308	1864	481	4868	2789	38%	1.75
EISN	358	45	171	114	28	13	199	127	35%	1.57
EKR2	35	15	25	23	26	8	51	31	89%	1.65
HQNE	130	15	69	66	21	3	90	69	53%	1.30
HQNG	3237	56	12225	945	1530	835	13755	1780	55%	7.73
HQNS	844	57	179	163	38	19	217	182	22%	1.19
HWY2	3963	48	1707	1289	374	54	2081	1343	34%	1.55
HYD4	592	33	93	87	40	20	133	107	18%	1.24
MULE	4466	20	1175	924	522	184	1697	1108	25%	1.53
OMVM	409	86	298	239	61	0	359	239	58%	1.50
PARK	117	12	18	18	0	0	18	18	15%	1.00
PL03	74	65	45	37	25	8	70	45	61%	1.56
PLPB	680	161	398	200	121	9	519	209	31%	2.48
POLB	218	31	179	146	102	20	281	166	76%	1.69
PS43	4259	96	3120	2055	1584	166	4704	2221	52%	2.12
RT57	271	33	124	105	40	15	164	120	44%	1.37
S053	3339	26	776	636	108	40	884	676	20%	1.31

SA11	797	63	480	409	247	32	727	441	55%	1.65
SP10	68	38	31	30	50	21	81	51	75%	1.59
TR11	82	34	52	44	12	1	64	45	55%	1.42
UP11	520	34	293	251	36	16	329	267	51%	1.23
VERY	12295	82	4271	3021	1070	228	5341	3249	26%	1.64
VOGL	72	40	14	13	0	0	14	13	18%	1.08
WTPR	530	174	249	181	66	46	315	227	43%	1.39
X042	1037	32	244	214	104	43	348	257	25%	1.35
X101	1734	46	563	409	196	79	759	488	28%	1.56
Average	1988	61	1106	651	327	90	1433	742	41%	1.65
Median	713	45	296	227	115	36	363	248	39%	1.52
St. Dev.	2724	48	2087	925	482	167	2476	1013	18%	0.97

Total: 46 independent schedules.

Appendix B – MS Project Out-of-Sequence VBA Code

```
Option Explicit
Sub CheckOutOfSequence()
'*******************************************************************************************
'* This macro will flag Text30 with offending predecessor out of sequence UIDS.            *
'* This macro was developed by Johnny "is totally awesome" Barrett   March 21, 2012        *
'* Further modified by Ron Winter, PSP FAACE 31OCT18                                       *
'* Feel free to copy/modify/distribute/delete/steal/take-credit-for any code found within. *
'*******************************************************************************************

Dim t As Task
Dim ts As Tasks
Dim a As Assignment
Dim pred As Task
Dim predcount As Long
Dim TotalTasks As Long
Dim TotalOOSActs As Long
Dim TotalOOSEvents As Long
Dim LastEventCount As Long
Dim L As Long
Dim TotalEarly As Long
Dim Testdate As Date

OptionsCalculation AUTOMATIC:=False
If MsgBox("WARNING: This will replace any custom data in Text30.  Do you want to continue?", _
    vbYesNo, "Out of Sequence Macro") = vbYes Then
    Set ts = ActiveProject.Tasks
    For Each t In ts
        t.Text30 = ""
        If Not (ts Is Nothing) Then ' this handles a blank task line
        If Not t.Summary Then
            TotalTasks = TotalTasks + 1
            LastEventCount = TotalOOSEvents ' if don't match, then a new OOS act was added.
            If IsDate(t.ActualStart) Then
                predcount = 1
                For Each pred In t.PredecessorTasks
                    'GET THE RELATIONSHIP TYPE
                    Select Case t.TaskDependencies(predcount).Type
                        Case pjFinishToStart
                            If pred.PercentComplete < 100 Then
                                'Note: Early Finish as it does not consider the data date.
                                TotalEarly = TotalEarly + t.RemainingDuration ' Best guess.
                                TotalOOSEvents = TotalOOSEvents + 1
                                t.Text30 = t.Text30 & pred.UniqueID & ","
                            ElseIf t.TaskDependencies(predcount).Lag > 0 Then
                                'Note: Any line that ends with a "_" means add the next line.
                                If Application.DateAdd(pred.ActualFinish, _
                                (t.TaskDependencies(predcount).Lag), _
                                ActiveProject.Calendar) > t.ActualStart Then
                                    Testdate = Application.DateAdd(pred.ActualFinish, _
                                        (t.TaskDependencies(predcount).Lag))
                                    L = Application.DateDifference(t.ActualStart, Testdate, _
                                        ActiveProject.Calendar)
                                    If L > 0 Then
                                        TotalEarly = TotalEarly + L
                                    End If
                                    TotalOOSEvents = TotalOOSEvents + 1
                                    t.Text30 = t.Text30 & pred.UniqueID & ","
                                End If
                            ElseIf t.TaskDependencies(predcount).Lag < 0 Then
                                If Application.DateSubtract(pred.ActualFinish, _
                                -(t.TaskDependencies(predcount).Lag), _
                                ActiveProject.Calendar) > t.ActualStart Then
                                    Testdate = Application.DateSubtract(pred.ActualFinish, _
                                        Abs((t.TaskDependencies(predcount).Lag)))
                                    L = Application.DateDifference(t.ActualStart, Testdate, _
                                        ActiveProject.Calendar)
                                    If L > 0 Then
                                        TotalEarly = TotalEarly + L
                                    End If
                                    TotalOOSEvents = TotalOOSEvents + 1
                                    t.Text30 = t.Text30 & pred.UniqueID & ","
                                End If
                            ElseIf pred.ActualFinish > t.ActualStart Then
                                Testdate = pred.ActualFinish
                                L = Application.DateDifference(t.ActualStart, Testdate, _
                                    ActiveProject.Calendar)
                                If L > 0 Then
                                    TotalEarly = TotalEarly + L
                                End If
                                TotalOOSEvents = TotalOOSEvents + 1
                                t.Text30 = t.Text30 & pred.UniqueID & ","
                            End If
                        Case pjStartToStart
                            If Not IsDate(pred.ActualStart) Then
                                If t.TaskDependencies(predcount).Lag > 0 Then
                                    Testdate = Application.DateAdd(pred.EarlyStart, _
                                        (t.TaskDependencies(predcount).Lag))
                                ElseIf t.TaskDependencies(predcount).Lag < 0 Then
                                    Testdate = Application.DateSubtract(pred.EarlyStart, _
                                        Abs((t.TaskDependencies(predcount).Lag)))
                                Else
                                    Testdate = pred.EarlyStart
                                End If
                                L = Application.DateDifference(t.ActualStart, Testdate, _
                                    ActiveProject.Calendar)
                                If L > 0 Then
                                    TotalEarly = TotalEarly + L
                                End If
                                TotalOOSEvents = TotalOOSEvents + 1
                                t.Text30 = t.Text30 & pred.UniqueID & ","
                            ElseIf t.TaskDependencies(predcount).Lag > 0 Then
                                If Application.DateAdd(pred.ActualStart, _
                                (t.TaskDependencies(predcount).Lag), _
                                ActiveProject.Calendar) > t.ActualStart Then
                                    Testdate = Application.DateAdd(pred.ActualStart, _
                                        (t.TaskDependencies(predcount).Lag))
                                    L = Application.DateDifference(t.ActualStart, Testdate, _
                                        ActiveProject.Calendar)
                                    If L > 0 Then
                                        TotalEarly = TotalEarly + L
                                    End If
                                    TotalOOSEvents = TotalOOSEvents + 1
                                    t.Text30 = t.Text30 & pred.UniqueID & ","
                                End If
                            ElseIf t.TaskDependencies(predcount).Lag < 0 Then
                                If Application.DateSubtract(pred.ActualStart, _
                                -(t.TaskDependencies(predcount).Lag), _
                                ActiveProject.Calendar) > t.ActualStart Then
```

```
            Testdate = Application.DateSubtract(pred.ActualStart, _
                Abs((t.TaskDependencies(predcount).Lag)))
            L = Application.DateDifference(t.ActualStart, Testdate, _
                ActiveProject.Calendar)
            If L > 0 Then
                TotalEarly = TotalEarly + L
            End If
            TotalOOSEvents = TotalOOSEvents + 1
            t.Text30 = t.Text30 & pred.UniqueID & ","
        End If
    ElseIf pred.ActualStart > t.ActualStart Then
        Testdate = pred.ActualStart
        L = Application.DateDifference(t.ActualStart, Testdate, _
            ActiveProject.Calendar)
        If L > 0 Then
            TotalEarly = TotalEarly + L
        End If
        TotalOOSEvents = TotalOOSEvents + 1
        t.Text30 = t.Text30 & pred.UniqueID & ","
    End If
Case pjFinishToFinish
    If IsDate(t.ActualFinish) And Not IsDate(pred.ActualFinish) Then
        'Note: Early Finish as it does not consider the data date.
        TotalEarly = TotalEarly + pred.RemainingDuration ' Best guess.
        TotalOOSEvents = TotalOOSEvents + 1
        t.Text30 = t.Text30 & pred.UniqueID & ","
    ElseIf t.TaskDependencies(predcount).Lag > 0 Then
        If Application.DateAdd(pred.Finish, _
        (t.TaskDependencies(predcount).Lag), _
        ActiveProject.Calendar) > t.Finish Then
            Testdate = Application.DateAdd(pred.Finish, _
                (t.TaskDependencies(predcount).Lag))
            L = Application.DateDifference(t.Finish, Testdate, _
            ActiveProject.Calendar)
            If L > 0 Then
                TotalEarly = TotalEarly + L
            End If
            TotalOOSEvents = TotalOOSEvents + 1
            t.Text30 = t.Text30 & pred.UniqueID & ","
        End If
    ElseIf t.TaskDependencies(predcount).Lag < 0 Then
        If Application.DateSubtract(pred.Finish, _
        -(t.TaskDependencies(predcount).Lag), _
        ActiveProject.Calendar) > t.Finish Then
            Testdate = Application.DateSubtract(pred.Finish, _
                Abs((t.TaskDependencies(predcount).Lag)))
            L = Application.DateDifference(t.Finish, Testdate, _
                ActiveProject.Calendar)
            If L > 0 Then
                TotalEarly = TotalEarly + L
            End If
            TotalOOSEvents = TotalOOSEvents + 1
            t.Text30 = t.Text30 & pred.UniqueID & ","
        End If
    ElseIf pred.Finish > t.Finish Then
        Testdate = pred.Finish
        L = Application.DateDifference(t.Finish, Testdate, _
            ActiveProject.Calendar)
        If L > 0 Then
            TotalEarly = TotalEarly + L
        End If
        TotalOOSEvents = TotalOOSEvents + 1
```

```
                            t.Text30 = t.Text30 & pred.UniqueID & ","
                        End If
                    Case pjStartToFinish
                        If t.TaskDependencies(predcount).Lag > 0 Then
                            If Application.DateAdd(pred.Start, _
                            (t.TaskDependencies(predcount).Lag), _
                            ActiveProject.Calendar) < t.Finish Then
                                Testdate = Application.DateAdd(pred.Start, _
                                    (t.TaskDependencies(predcount).Lag))
                                L = Application.DateDifference(t.Finish, Testdate, _
                                    ActiveProject.Calendar)
                                If L > 0 Then
                                    TotalEarly = TotalEarly + L
                                End If
                                TotalOOSEvents = TotalOOSEvents + 1
                                t.Text30 = t.Text30 & pred.UniqueID & ","
                            End If
                        ElseIf t.TaskDependencies(predcount).Lag < 0 Then
                            If Application.DateSubtract(pred.Start, _
                            -(t.TaskDependencies(predcount).Lag), _
                            ActiveProject.Calendar) < t.Finish Then
                                Testdate = Application.DateSubtract(pred.Start, _
                                    Abs((t.TaskDependencies(predcount).Lag)))
                                L = Application.DateDifference(t.Finish, Testdate, _
                                    ActiveProject.Calendar)
                                If L > 0 Then
                                    TotalEarly = TotalEarly + L
                                End If
                                TotalOOSEvents = TotalOOSEvents + 1
                                t.Text30 = t.Text30 & pred.UniqueID & ","
                            End If
                        ElseIf pred.Start > t.Finish Then
                            Testdate = pred.Start
                            L = Application.DateDifference(t.Finish, Testdate, _
                                ActiveProject.Calendar)
                            If L > 0 Then
                                TotalEarly = TotalEarly + L
                            End If
                            TotalOOSEvents = TotalOOSEvents + 1
                            t.Text30 = t.Text30 & pred.UniqueID & ","
                        End If
                End Select
                predcount = predcount + 1
            Next pred
            If LastEventCount < TotalOOSEvents Then
                'This activitiy started out-of-sequence
                TotalOOSActs = TotalOOSActs + 1
                L = Len(t.Text30)
                If L > 0 Then
                    t.Text30 = Left(t.Text30, L - 1) ' Remove last comma
                End If
            End If
        End If
    End If
    End If
Next t
If TotalTasks = 0 Then
    MsgBox ("There were no tasks to check.")
Else
    If TotalOOSActs > 0 Then
        TotalEarly = TotalEarly / TotalOOSActs / 60 / ActiveProject.HoursPerDay
    End If
```

```
        MsgBox "Out-of-Sequence calculations are complete.  Look to Text30" & vbCrLf & _
              "for a list of predecessors to the out-of-sequence activity." & vbCrLf & vbCrLf & _
               "Out-of-Sequence progress statistics for this project:" & vbCrLf & _
               "    " & TotalTasks & " tasks were reviewed," & vbCrLf & _
               "    " & TotalOOSActs & " were out-of-sequence," & vbCrLf & _
               "    " & TotalOOSEvents & " out-of-sequence events occurred," & vbCrLf & _
               "    " & Format(TotalOOSActs / TotalTasks, "0%") & _
               " of tasks were out-of-sequence, and" & vbCrLf & _
               "    " & TotalEarly & " workdays average early start.", 64
    End If
Else
    MsgBox "No changes were made."
End If
OptionsCalculation AUTOMATIC:=True
End Sub
```