

Natural Engineer

Version 4.4.2

Application Analysis &

Modification

for Windows

Manual Order Number: NEE442-023WIN

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This document applies to Natural Engineer version 4.4.2 and to all subsequent releases.

Specifications contained herein are subject to change, and these changes will be reported in subsequent revisions or editions.

Readers' comments are welcomed. Comments may be addressed to the Documentation Department at the address on the back cover. Internet users may send comments to the following e-mail address:

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ABOUT THIS MANUAL

Purpose of this manual

This manual contains the Application Analysis and Modification for Natural Engineer.

It describes the Analysis and Modification processes available to interrogate and maintain your Natural applications within Natural Engineer.

The topics cover the Analysis options found under the Analysis menu, which include:

- How to create multiple Impact versions of Impact search criteria for an application, which allow multiple analysis of applications by more than one user.
- How to specify the Impact search criteria, what Natural keywords are supported, additional combination and miscellaneous keywords.
- Additional data preparation options to create Impact Sets, Object Builder line range criteria and Application Standards.
- The Impact execution process and how to review the Impact results using the Impact Element Maintenance screen or the Impact reporting options.

The topics cover the Modification options found under the Modification menu, which include:

- Specifying Modification Preferences to reference Text Logic Members (TLM) during Modification execution to include in-house written processes into the modified objects.
- Reviewing and re-specifying Modification parameters and settings prior to applying the actual Modification.
- The Modification execution process and how to review the Modification results.

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Target Audience

The target audience for this manual is intended to be any User of Natural Engineer at any level of experience.

Typographical Conventions used in this manual

The following conventions are used throughout this manual:

UPPERCASE TIMES	Commands, statements, names of programs and utilities referred to in text paragraphs appear in normal (Times) uppercase.
UPPERCASE BOLD COURIER	In illustrations or examples of commands, items in uppercase bold courier must be typed in as they appear.
< >	Items in angled brackets are placeholders for user-supplied information. For example, if asked to enter <file number>, you must type the number of the required file.
<u>Underlined</u>	Underlined parts of text are hyperlinks to other parts within the online source manual. This manual was written in MS-Word 97 using the "hyperlink" feature.

The following symbols are used for instructions:

⇒	Marks the beginning of an instruction set.
□	Indicates that the instruction set consists of a single step.
1.	Indicates the first of a number of steps.

How this manual is organized

This manual is organized to reflect the Application Analysis and Modification options of Natural Engineer in the following chapters:

Chapter	Contents
1	Describes the various Impact options available to create Impact versions of search criteria, the search criteria, the various search keywords available, the Impact execution process and how to review the Impact results.
2	Describes the various Modification options available to review and re-specify the Modification parameters and settings, execute Modification to modify the object source code within an application and how to review the Modified objects.
3	Describes the combination keywords that are available when specifying Impact search criteria. These keywords allow various multiple sub-criteria to be specified and are used to handle more complex analysis within objects. An example of this would be the search keyword MVS _{NAT22} TO31 that checks for Natural 2.2 to 3.1 migration compliance of applications.

Terminology

It is assumed that you are familiar with general Natural and mainframe terminology, as well as the terms and concepts relating to Microsoft Windows operating systems. This section explains some terms that are specific to the Natural Engineer product.

Analysis

The Analysis process of Natural Engineer searches application data within the Natural Engineer Repository, according to specified Search Criteria and generates reports on the search results.

Application

An Application is a library or group of related libraries, which define a complete Application. In Natural Engineer, the Application can have a one-to-one relationship with a single library of the same name, or a library of a different name, as well as related steplibs. The Application refers to all the source code from these libraries, which Natural Engineer loads into the Repository.

Browser

An Internet Browser such as Microsoft Internet Explorer or Netscape.

Category

Categories in Natural Engineer specify whether and how a Modification is applied to the Natural code. Valid categories are: Automatic change, Manual change, Reject the default Modification, No change to the data item, and the data item is in Generated Code.

A category is further broken down according to type of change (for example: Keyword, Literal, Data Item, Database Access, Definition).

Consistency

An option in the Analysis process that causes Natural Engineer to trace an Impact through the code, using left and right argument resolution to identify further code impacted by the code found.

Environment

The Environment process is the means by which Natural Engineer generates a structured view of the application code in the Natural Engineer Repository. This provides application analysis reports and inventory information on the application and is used as the basis for Impact Analysis.

Exception

An Exception is an Item identified as impacted that does not require a Modification. Where there are a few similar Exception Items, they can be treated as Exceptions, and rejected in the Modification review process. Where there are many similar (therefore not Exceptions), consideration should be given to changing the Search Criteria so they are not identified as impacted in the first place.

Generated Code

This is code which has been generated by a Natural code generator, such as Construct, and which is not normally modified directly in the Natural editor.

Impact

An Impact is an instance of a Natural code Item; e.g., data item or statement (a “hit” scored by the Analysis process) that matches the defined Search Criteria used in the Analysis process.

Iteration

An Iteration is one examination cycle of a field identified according to the specified Search Criteria. For example, one Iteration is reading the field right to left. Multiple Iterations are performed when the option of ‘Consistency’ or Multi Search is requested for Analysis, and Natural Engineer performs as many Iterations as necessary to exhaust all possibilities of expressing and tracing the field, and can be limited by a setting in the NATENG.INI file.

Library

A single library of source code, which exists in the Natural system file.

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Modification

A Modification is a change suggested or made to an object or data item resulting in the required compliance of that object or data item. Modifications in Natural Engineer are classified according to Category and Type.

Presentation Split Process

The Presentation Split Process is a sub-function of the Object Builder function that removes screen I/O statements from current application objects and places them in generated subprograms.

Soft Link

A Soft Link is where a link between two objects has been defined using an alphanumeric variable rather than a literal constant.

Technical Split Process

The Technical Split Process is a sub-function of the Object Builder function that results in the encapsulation of each database access within the application, into a sub-program so that the application is separated into 'presentation and logic' and 'database access'.

Type

The Type of Modification available, for example: Data Item, Keyword and Literal.

TLM

Text Logic Members are used to contain the code required to support inclusion of common code into the application. An example of this is the code to include into an application before updating a database.

Related Literature

The complete set of Natural Engineer manuals consists of:

1 Natural Engineer Concepts and Facilities (NEE442-006ALL)

The Concepts and Facilities manual describes the many application systems problems and solutions offered by Natural Engineer, providing some guidelines and usage that can be applied to Natural applications.

2 Natural Engineer Release Notes (NEE442-008ALL)

The Release Notes describe all the information relating to the new features, upgrades to existing functions and documentation updates that have been applied to Natural Engineer.

3 Natural Engineer Installation Guide (NEE442-010ALL)

The Installation Guide provides information on how to install Natural Engineer on both PC and mainframe platforms.

**4 Natural Engineer Administration Guide (NEE442-040WIN)
Natural Engineer Administration Guide (NEE442-040MFR)**

The Administration Guide provides information on all the various control settings available to control the usage of the different functions within Natural Engineer.

**5 Natural Engineer Application Management (NEE442-020WIN)
Natural Engineer Application Management (NEE442-020MFR)**

The Application Management manual describes all the functions required to add Natural applications into the Repository.

**6 Natural Engineer Application Documentation (NEE442-022WIN)
Natural Engineer Application Documentation (NEE442-022MFR)**

The Application Documentation manual describes all the available functions to document a Natural application within the Repository. These functions will help enhance / supplement any existing systems documentation such as BSD / CSD / Specifications etc.

**7 Natural Engineer Application Analysis and Modification (NEE442-023WIN)
Natural Engineer Application Analysis and Modification (NEE442-023MFR)**

The Application Analysis and Modification manual describes all the available functions to carry out analysis of Natural applications; including basic keyword searches. The modification process is described and detailed to show how it can be applied to modify single selected objects within a Natural application, or the entire Natural application in one single execution.

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**8 Natural Engineer Application Restructuring (NEE442-024WIN)
Natural Engineer Application Restructuring (NEE442-024MFR)**

The Application Restructuring manual describes the analysis and modification functionality required to carryout some of the more sophisticated functions such as Object Builder.

**9 Natural Engineer Utilities (NEE442-080WIN)
Natural Engineer Utilities (NEE442-080MFR)**

The Utilities manual describes all the available utilities found within Natural Engineer and, when and how they should be used.

10 Natural Engineer Reporting (NEE442-025ALL)

The Reporting manual describes each of the reports available in detail, providing report layouts, how to trigger the report and when the report data becomes available. The various report-producing mediums within Natural Engineer are also described.

11 Natural Engineer Batch Processing [Mainframes] (NEE442-026MFR)

The Batch Processing manual describes the various batch jobs (JCL) and their functionality.

12 Natural Engineer WebStar (NWS442-020ALL)

The WebStar manual describes the concepts and facilities, installation and configuration options, how to web enable a Natural application and how to create and execute Natural Short Transactions using the Natural Engineer add-on component WebStar.

13 Natural Engineer WebStar Release Notes (NWS442-008ALL)

The Release Notes describe all the information relating to the new features, upgrades to existing functions and documentation updates that have been applied to the Natural Engineer add-on component WebStar.

14 Natural Engineer Messages and Codes (NEE442-060ALL)

The Messages and Codes manual describes the various messages and codes produced by Natural Engineer.

IMPACT ANALYSIS PROCESSES

Chapter Overview

The Impact Analysis processes provide all the facilities to run analytical interrogation of each application held on the Repository. The results from these interrogations provide the basis for any desired modifications to the objects within an application.

Once Impact Analysis has been executed, there are various reporting options to view the results either online or using textual reports.

All the Impact Analysis processes are available from the Analysis menu.

The topics covered in this chapter:

1. [Impact Version](#)
2. [Impact Search Criteria](#)
3. [Impact Data Preparation](#)
4. [Impact Execution](#)
5. [Impact Element Maintenance](#)
6. [Impact Analysis Inventory](#)

Impact Version

The Impact Version option allows you to save multiple sets of Impact Search Criteria for an application and provides a management facility to administer these search criteria for all options found in the Analysis and Modification menus.

The Impact Version screen allows you to add new versions, delete or modify existing versions and create Impact sets.

When deleting an Impact Version, then all the associated Impact search criteria and any Impact data that may have been generated during any previous Impact execution for this version, will all be deleted.

The Impact Version option supports up to a maximum of 99 versions per application.

Impact Version Window

The Impact Version window is accessed using the following menu navigation: Analysis → Impact Version.

The following Figure 1-1 illustrates the Impact Version screen.

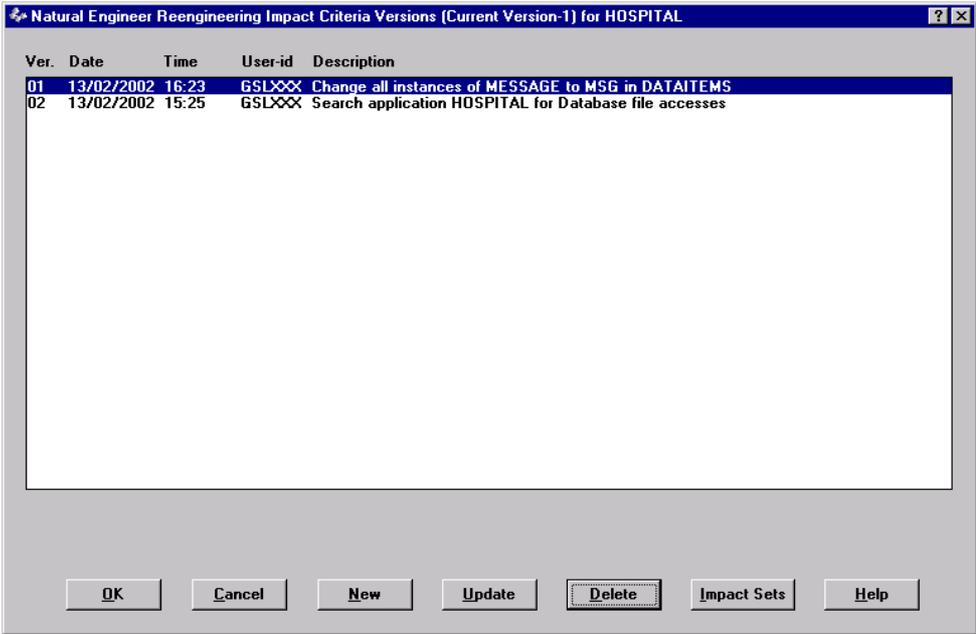


Figure 1-1 Impact Version screen

SCREEN ITEMS	DESCRIPTION
Ver	The impact analysis version number for the application. A maximum of 99 versions of impact analysis are available for each application.
Date	The date the impact version was modified.
Time	The time the impact version was modified.
User-id	The user identifier of the person who modified the impact version.
Description	Comment to describe the purpose of the impact version.
When either adding a new version or updating an existing version, there will be 2 new areas available on the screen:	
Version	This shows the version number applicable. This value is internally generated and cannot be modified. Any deleted version numbers will be reused.
Description	This is an input area where a suitable comment can be added to assist in identifying each version.

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BUTTON NAME	DESCRIPTION
OK	<p>Has dual functionality:</p> <p>1. If selecting a version This will accept the selected version making it current for any further Impact or Modification processes and will return back to the main Natural Engineer screen.</p> <p>2. If adding a new version or updating an existing version This will accept the new or updated version details and refresh the version details being listed.</p>
Cancel	<p>Has dual functionality:</p> <p>1. If selecting a version Cancels any selection made and will return back to the main Natural Engineer screen.</p> <p>2. If adding a new version or updating an existing version This will cancel the new or updated version details and refresh the impact version screen.</p>
New	Will open the 'Add version and description' areas on the screen and pre-fill the version with the next available number. Any deleted version numbers will be reused.
Update	Will open the update version and description areas on the screen and pre-fill them with the version number and description currently specified. The version number is non-modifiable.
Delete	<p>Will delete the selected version. The deleted version number will be reused the next time a new version is added.</p> <p><i>Note: When a version is deleted, the criteria set and any impacted data from previous impact executions will also be removed.</i></p>
Impact Sets	<p>Invokes the Impact Sets window.</p> <p><i>Note: For more information on the Impact Sets screen refer to the section Impact Sets window.</i></p>
Help	Invokes the Impact Version help.

Impact Search Criteria

Impact Search Criteria are used to identify instances of specified keywords and/or keyword values within object source code. The Impact Search Criteria can also be specified to hold replacement values, which are used by the Modification process.

Impact Search Criteria can be added, deleted, updated and reviewed using the Impact Search Criteria Summary screen. Each set of criteria will apply to a single Impact version, allowing for multiple sets of criteria to be specified for a single application.

The Impact Search Criteria can be saved to a PC text file, allowing them to be re-used across applications. These files will have a file extension of '.IRE'. By default these files will be saved to the data folder where Natural Engineer is installed. For example: X:\PROGRAM FILES\SOFTWARE AG\NATURAL ENGINEER\4.4.2\DATA, where X: is the drive on which Natural Engineer was installed.

Impact Search Criteria Summary Window

The Impact Search Criteria window is accessed using the following menu navigation: Analysis → Impact Search Criteria.

When this option is selected, the Impact Search Criteria Summary screen is displayed. This screen will show a summary of the criteria that have been specified for an Impact Version.

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The following Figure 1-2 illustrates the Impact Search Criteria Summary screen.

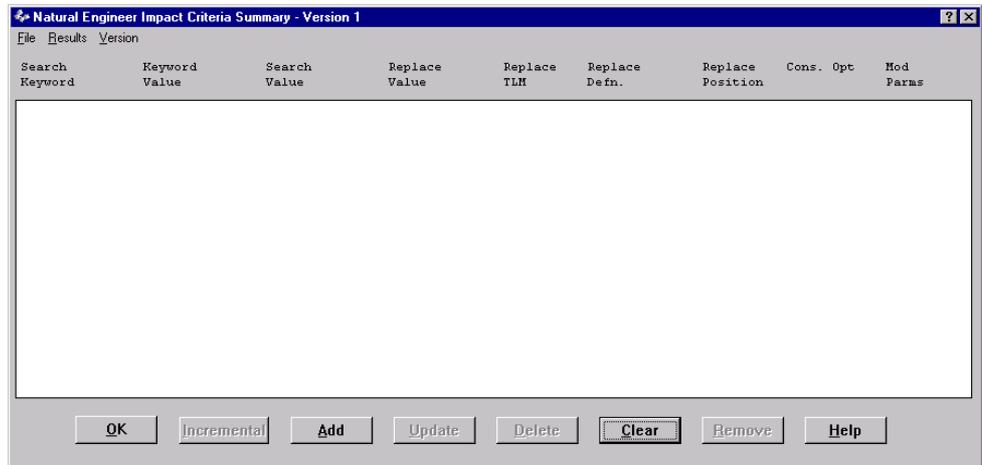


Figure 1-2 Impact Search Criteria Summary screen

MENU ITEMS	OPTIONS	DESCRIPTION
File	Open	Open a previously saved Impact Search Criteria file.
	Save As	Save the currently defined Impact Search Criteria.
	Exit	Will exit the Impact Search Criteria Summary screen and return back to the main Natural Engineer screen.
Results	Maximum Iteration	The maximum iteration number that is to be kept for the completed impact execution. All other data at a higher iteration will be deleted.
Version		Will invoke the Impact Version screen allowing you to select an alternate version or add a new one.

SCREEN ITEMS	DESCRIPTION
Search Keyword	The keyword to be searched for.
Keyword Value	The associated value with the keyword, such as an object name.
Search Value	The value specified for searching, such as the text in a literal.

SCREEN ITEMS	DESCRIPTION
Replace Value	The value to replace the value found.
Replace TLM	The TLM to be inserted into the code.
Replace Defn.	The format and length to replace the definition found e.g. replace N8 with A8, where N8 is the Search Value (Definition) and A8 is the Replace Definition.
Replace Position	The physical replacement location for the TLM: Replace, After or Before.
Cons.	<p>Consistency - Causes the Analysis to trace impacts through the code. There are 3 types of Consistency available:</p> <p>Y Standard Consistency when using search keywords ADJUST, DATAITEM, DBFILE and DEFINITION.</p> <p>S Single Iteration when using Multi Search criteria.</p> <p>M Multiple Iteration when using Multi Search criteria.</p>
Opt	<p>This shows the type of search criteria applicable. Valid types are :</p> <p>Blank Standard Impact criteria.</p> <p>IN1 Incremental, "Apply to whole application".</p> <p>IN2 Incremental, "Only previously impacted objects".</p> <p>IN3 Incremental, "Only previously impacted statements".</p> <p>OEM Object Builder or manual source code update.</p> <p><i>Note: For more information on the Incremental types refer to the section Incremental Impact Criteria Preferences.</i></p> <p><i>Note: For more information on the Object Builder types refer to the section Object Builder Processing.</i></p>
Mod Parm	This shows specific modification parameters for specific search keywords.

BUTTON NAME	DESCRIPTION
OK	Saves the criteria that have been specified and returns back to the main Natural Engineer screen.
Incremental	<p>Invokes the Impact Criteria screen, where the criteria can be specified and then the Incremental Impact Criteria Preferences set. This option is only available when impact data exists (created by one or more criteria).</p> <p><i>Note: For more information on the Impact Criteria screen refer to the section Impact Criteria window.</i></p> <p><i>Note: For more information on the Incremental Impact Criteria Preferences refer to the section Incremental Impact Criteria Preferences.</i></p>
Add	<p>Invokes the Impact Criteria screen where the new criteria can be specified.</p> <p><i>Note: For more information on the Impact Criteria screen refer to the section Impact Criteria window.</i></p>
Update	<p>Will invoke the Impact Criteria screen for the selected criteria. Only one single criteria can be selected for this option.</p> <p><i>Note: For more information on the Impact Criteria screen refer to the section Impact Criteria window.</i></p>
Delete	<p>Will delete the selected criteria. Multiple criteria can be selected for this option.</p> <p><i>Note: The delete process will only remove the criteria, any previously impacted data will still be available until the next impact execution.</i></p>
Clear	<p>Will delete all the criteria for the current selected version.</p> <p><i>Note: The clear process will only remove the criteria, any previously impacted data will still be available until the next impact execution.</i></p>
Remove	Will delete all the criteria and associated impact data for the selected criteria. Only one single criteria can be selected for this option.
Help	Invokes the Impact Search Criteria help.

Note: Criteria can be selected from the Impact Search Criteria Summary screen by using the left mouse button with a single click. Holding down the shift or control keys allows multiple criteria to be selected.

Incremental Impact Criteria Preferences

Incremental Impact Criteria Preferences allow you to perform an Analysis over the results of a previous Analysis, i.e., only newly added search criteria will be used during the impact execution. The previous search criteria must not be modified; only new entries should be added.

This is called Incremental Impact.

The Incremental Impact Criteria Preferences can be set when adding Impact search criteria using the **Incremental** button on the Impact Search Criteria Summary screen.

This will allow you to add new criteria, specifying the details in the same way as standard criteria. The difference is that when confirming the criteria using the **OK** button, the Incremental Impact Criteria Preferences window is presented.

The following Figure 1-3 illustrates the Incremental Impact Criteria Preferences screen.

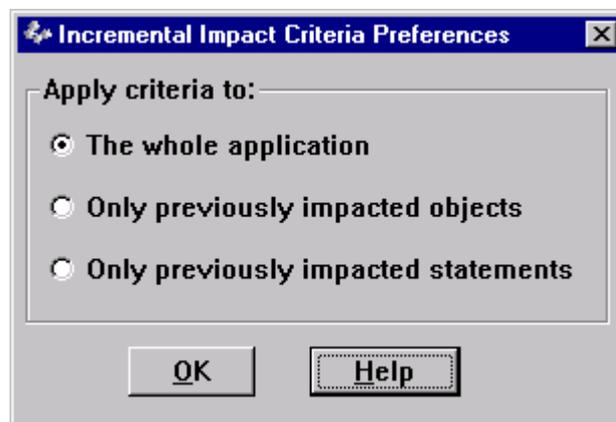


Figure 1-3 Incremental Impact Criteria Preferences screen

The Incremental Impact Criteria Preferences screen allows the specification of how the Incremental Criteria are to be applied.

- **“The Whole Application”**

Impact Execution will apply the incremental criteria against all the objects in the current application, adding the incremental criteria impacts to the existing criteria.

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This can prove to be useful if the application contains a large number of objects and re-running all the impact criteria in addition to the newly added criteria may take a long time to complete.

These incremental criteria will have a criteria option set to “IN1”.

- **“Only Previously Impacted Objects”**

Impact execution will apply the incremental criteria only against the objects that have been previously impacted during the last impact execution. All objects within the application that have not been previously impacted will not be impacted for the new incremental criteria.

This is a useful way of refining the impact results to help identify more specifically impact data of interest.

These incremental criteria will have a criteria option set to “IN2”.

- **“Only Previously Impacted Statements”**

Impact execution will apply the incremental criteria only against the statements that have been previously impacted during the last impact execution. All previously non-impacted statements in all objects within an application will not be impacted for the new incremental criteria.

This is another useful way of refining the impact results to help identify more specifically impact data of interest.

These incremental criteria will have a criteria option set to “IN3”.

After incremental impact has been executed, there are three options that can be taken:

1. Add a new non- incremental criteria to the impact criteria in the current version

This will result in the next impact execution disregarding any previous impact results and will apply ALL the criteria in the current version against all the objects in the application.

2. Add a new Incremental criteria.

This will restart the Incremental impact process depending on the criteria option selected for the incremental criteria. When adding new incremental criteria it is not possible to go backwards in the incremental chain, i.e., it is only possible to add an incremental criteria at the same level as the previous incremental or the next level down.

Examples:

- (1) If the previous impact execution was for an incremental “IN1”, then new incremental criteria can be added as IN1, IN2 or IN3.
- (2) If the previous impact execution was for an incremental “IN2”, then new incremental criteria can be added as IN2 or IN3 only.
- (3) If the previous impact execution was for an incremental “IN3”, then new incremental criteria can be added as IN3 only.

3. Update the Incremental criteria

As there has been extensive post-processing to the results of all the criteria, it is not possible to update any criteria previous to the last incremental one. Therefore, the only criteria you can update is the last incremental one. The incremental criteria can only be changed as to how the incremental criteria is to be applied during impact execution (IN1; IN2; IN3).

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Impact Criteria Window

Impact Search Criteria can be added or updated using the Impact Criteria window. This can be invoked by using either the ‘Add’ or ‘Update’ buttons on the Impact Search Criteria screen.

The following Figure 1-4 illustrates the Impact Criteria screen.

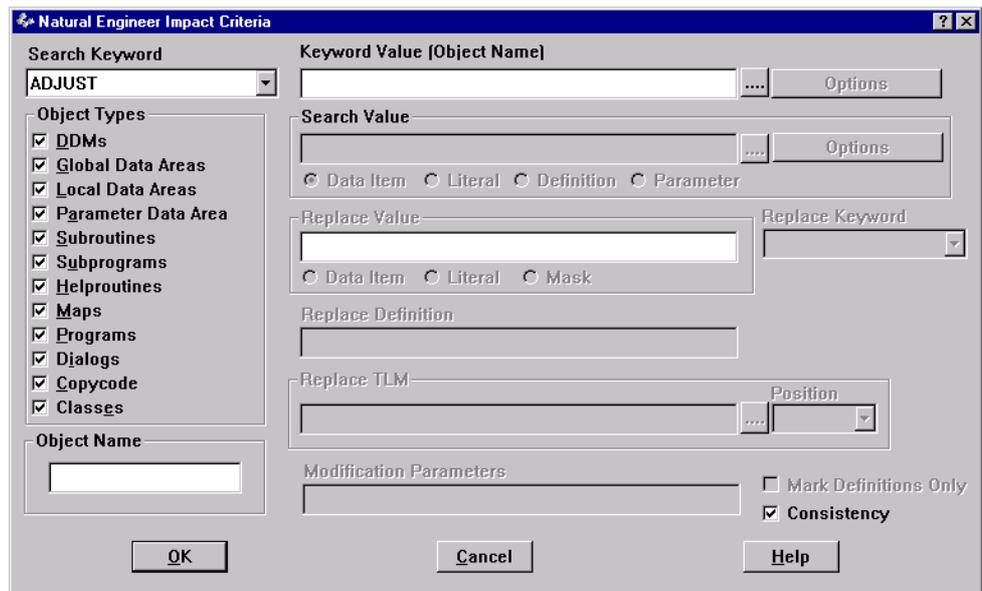


Figure 1-4 Impact Criteria screen

SCREEN ITEMS	DESCRIPTION
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Search Keyword	This option allows you to select a keyword from a list of valid search keywords.
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Note: For more information on the available search keywords refer to the section [Search Keywords](#).

SCREEN ITEMS	DESCRIPTION
Object Types	<p>Allows you to select or deselect which object types you want the Analysis to process. Available selections are:</p> <ul style="list-style-type: none"> ▪ DDMs ▪ Global Data Areas ▪ Local Data Areas ▪ Parameter Data Area ▪ Subroutines ▪ Subprograms ▪ Helproutines ▪ Maps ▪ Programs ▪ Dialogs ▪ Copycode ▪ Classes
Object Name	<p>The name of the object to be searched, this can be used with the Object Type options to limit what impact analysis will search.</p> <p>Object names can be entered in full or use the wild card '*' to specify a range of object names. For example:</p> <p>XX001P01 This will search the object XX001P01 only. XX0* This will search all objects with names prefixed by XX0.</p>
Keyword Value	<p>The call name value, usually an object name, directly associated with the keyword. For example:</p> <p>FETCH has an associated program object name. CALLNAT has an associated subprogram object name. INPUT MAP has an associated map object name. HISTOGRAM has an associated DDM name.</p> <p>The Keyword Value can be specified using a full or partial call name. Partial values can be input using wild card '?'. For example:</p> <p>XX? Will search for all call names starting with XX. ?XX Will search for all call names ending with XX. ?XX? Will search for all call names containing XX.</p> <p>The Keyword Value can also be specified using a mask value for the call name. This can only be used for non-DDM related keywords, for example: CALLNAT, FETCH and INPUT MAP.</p> <p><i>Note: For more information on using call name masks refer to the section Keyword Options window.</i></p>

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SCREEN ITEMS	DESCRIPTION
--------------	-------------

Search Value	
---------------------	--

The value being searched, such as the text in a literal. You must specify for what type of value you are searching, using the radio buttons:

Data Item

This searches for the full or partial value of the data item name specified. Partial values can be input using wild card '?'. For example:

#ABC? Will search for all data items starting with #ABC.

?#ABC Will search for all data items ending with #ABC.

?#ABC? Will search for all data items containing #ABC.

Literal

The literal search locates all text and numeric constants in objects, as well as edit mask definitions. Partial values can be input using wild card '?'. For example:

Hello? Will search for all literal strings starting with Hello.

?Hello Will search for all literal strings ending with Hello.

?Hello? Will search for all literal strings containing Hello.

Definition

This option allows for the searching of a format and length or a range of format and lengths within the objects. The data is entered as a format type and length and with a range this is repeated with a '-' in between the two values. For example:

A001 Will locate all one-byte alphanumeric data items.

A001-A010 Will locate all alphanumeric data items with a length greater than or equal to one and less than or equal to ten.

Parameter

This option allows for the searching of the number of parameters that exist with statements that pass data items, e.g., CALLNAT, FETCH. With the parameter option you enter the number of parameters that are required. For example:

Specifying a value of 3 with the CALLNAT keyword will locate all CALLNATs that have three data items specified for the parameter reference.

SCREEN ITEMS	DESCRIPTION
--------------	-------------

Replace Value

Replaces the value found by the Search Value, this can be an object name, DDM, data item or literal. Depending on what has been entered in the search value, the screen changes to identify what will be replaced. In addition you have the following buttons available:

Data item

This option identifies that the Replace Value is to be used as a data item, for example if you are searching for a literal and want to replace it with a data item this option is required to replace the literal correctly.

Literal

This is used to specify the opposite of the data item, if you are searching for a data item and want to replace it with a literal then this option is required.

Mask

This option provides the facility to modify applications to support language code processing.

This option is used to identify the Replace Value as a mask value, which will be used against the search value. This option is only available for search keywords utilizing language code processing for example: CALLNAT, FETCH and INPUT MAP.

The Replace Value must be specified using the following convention:

- . (period) Indicates a single position that is not to be checked.
- * (asterisk) Wildcard used to indicate that the replacement applies to the last character position.
- & (ampersand) The replacement character.

Examples:

Old Name	Mask Value	New Name
MAP001M&	MAP00&M
MAP001&	MAP00&
SUBPGM01	*&	SUBPGM0&
SPGM1	*&	SPGM&

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SCREEN ITEMS	DESCRIPTION
Replace Keyword	<p>This option allows you to select a keyword that will replace the Search Keyword. This option is only available for keywords that execute other objects, e.g., CALLNAT and you can replace this with, for example a CALL or FETCH statement.</p> <p>This option is only available for the following Search Keywords:</p> <ul style="list-style-type: none"> • CALL • CALL FILE • CALL INTERFACE4 • CALL LOOP • CALLNAT • FETCH • FETCH REPEAT • FETCH RETURN • INVESTIGATE • PERFORM • RUN • RUN REPEAT • RUN RETURN
Replace Definition	Replaces the data item definition with the new format or length.
Replace TLM	The name of the Text Logic Member (TLM) that will be inserted in the application code.
Position	<p>Determines the actual placement of the Replace TLM. Available options are:</p> <ul style="list-style-type: none"> ▪ REPLACE ▪ AFTER ▪ BEFORE
Mark Definitions Only	Only used for search keyword DATAITEM. Causes the analysis to mark definitions only, not all occurrences. This can be set for Consistency.
Consistency	<p>Causes the Analysis to trace code identified, for further impact on other code. For example:</p> <p>MOVE #A TO #B.</p> <p>Using the search keyword DATAITEM and search value #A the above statement will be impacted as follows:</p> <p>With Consistency set off: #A will be impacted as it is the specified item.</p> <p>With Consistency set on: #A will be impacted as the specified item and #B will be impacted as it is being propagated by #A.</p> <p><i>Note: This option is only available for Search Keywords ADJUST, DATAITEM, DBFILE and DEFINITION.</i></p>

SCREEN ITEMS	DESCRIPTION
Modification Parameters	This is used for specific modification parameters for specific search keywords. The following search keywords currently use this option: OBJECT BUILDER <i>Note: For more information on Object Builder refer to the section Object Builder Processing.</i>

BUTTON NAME	DESCRIPTION
Keyword Value Selection [....]	Invokes the General Selection screen, listing either Objects or DDMs loaded in the Repository for an application. The items listed are dependent on the Search Keyword being used. <i>Note: For more information on the General Selection screen refer to Chapter 2 in the Concepts and Facilities manual.</i>
Keyword Value Options	This option provides further refinement options for a Search Keyword. The button text will alter accordingly with each Search Keyword that activates this option. The following Search Keywords use this facility: <u>Combination Search Keywords:</u> CODE OPTIMIZATION The button text will show ' Code Opt Options '. MULTI SEARCH The button text will show ' Multi Options '. MVSNAT22TO31 The button text will show ' MVSNAT2231 Opts '. PORTING The button text will show ' Porting Options '. <i>Note: For more information on these Combination Search Keywords and their refinement options refer to Chapter 3 Combination Search Keywords.</i> <u>Natural Keywords that utilize optional clauses:</u> COMPOSE, FIND, SEND and STACK The button text will show ' Options '. This will invoke the Keyword Options screen where further refinement options can be selected.

BUTTON NAME	DESCRIPTION
	<p><u>Natural Keywords that utilize call names:</u></p> <p>These are Natural Keywords that make reference to an external object, for example: CALLNAT, FETCH and INPUT MAP.</p> <p>The button text will show 'Options'.</p> <p>This will invoke the Keyword Options screen where further refinement options can be selected.</p> <p><i>Note: For more information on the Keyword Options screen refer to the section Keyword Options window.</i></p>
Search Value Selection [...]	<p>Invokes the General Selection screen, listing either Dataitems or DDM Fields loaded in the Repository for an application. The items listed are dependent on the Search Keyword being used.</p> <p><i>Note: For more information on the General Selection screen refer to Chapter 2 in the Concepts and Facilities manual.</i></p>
Search Value Options	<p>This button is only available for the Search Keyword LITERAL. If used it will invoke the Literal Options screen, where further refinement options can be selected.</p> <p><i>Note: For more information on the Literal Options screen refer to the section Literal Options window.</i></p>
Replace TLM Selection [...]	<p>Invokes the General Selection screen, listing any Objects with object type 'Text' either from the Modification library or the Natural library SYSTEM.</p> <p><i>Note: For more information on the General Selection screen refer to Chapter 2 in the Concepts and Facilities manual.</i></p>
OK	Accepts the criteria specifications input and returns back to the Impact Search Criteria Summary screen.
Cancel	Cancels any criteria specifications input and returns back to the Impact Search Criteria Summary screen.
Help	Invokes the Impact Criteria help.

Search Keywords

The Analysis process allows the selection of a Search Keyword in the Criteria. These may be [Natural Keywords](#), [Combination Keywords](#) or [Miscellaneous Keywords](#).

Natural Keywords

The following table lists the Natural Keywords available for the Impact Search Criteria.

ACCEPT	END-ENDPAGE	MULTIPLY
ADD	END-ERROR	NEWPAGE
ASSIGN	END-FILE	NEWPAGE TITLE
AT BREAK OF	END-FIND	OBTAIN
AT END OF DATA	END-FOR	ON ERROR
AT END OF FILE	END-HISTOGRAM	OPEN CONVERSATION
AT END OF PAGE	END-IF	OPEN DIALOG
AT START OF DATA	END-INTERFACE	OPTIMIZE
AT TOP OF PAGE	END-LOOP	OPTIONS
BACKOUT	END-METHOD	ORDER BY
BEFORE BREAK	END-NOREC	PASSW
BROWSE	END-PROCESS	PERFORM
BROWSE BY	END-PROPERTY	PLOT
BROWSE WITH	END-READ	PRINT
BROWSE WHERE	END-REPEAT	PROCESS
CALL	END-SELECT	PROCESS COMMAND
CALL FILE	END-SORT	PROCESS GUI ACTION
CALL INTERFACE4	END-START	PROCESS SQL
CALL LOOP	END-TOPPAGE	PROCESS REPORT
CALLNAT	END-SUBROUTINE	PROCESS REPORTER

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CLOSE CONVERSATION	END-WORK	PROPERTY
CLOSE DIALOG	ENTER	READ
CLOSE PC	ESCAPE	READ BY
CLOSE PRINTER	ESCAPE BOTTOM	READ PC
CLOSE WORK	ESCAPE ROUTINE	READ WITH
CREATE OBJECT	ESCAPE TOP	READ WHERE
COMMIT	EXAMINE	READ WORK
COMPOSE	EXAMINE TRANSLATE	REDEFINE
COMPOSE ASSIGNING	EXPAND	REDUCE
COMPOSE EXTRACTING	FETCH	REINPUT
COMPOSE FORMATTING	FETCH REPEAT	REINPUT MARK
COMPOSE MOVING	FETCH RETURN	REJECT
COMPOSE RESETTING	FIND	RELEASE SETS
COMPRESS	FIND WITH	RELEASE STACK
COMPUTE	FIND WHERE	RELEASE VARIABLES
DECIDE	FIND COUPLED	REPEAT
DECIDE VALUE ALL	FIND FIRST	REPEAT UNTIL
DECIDE VALUE ANY	FIND NUMBER	REPEAT WHILE
DECIDE VALUE NONE	FIND UNIQUE	RESET
DECIDE VALUE	FIND RETAIN	RETRY
DECIDE WHEN ALL	FIND SORTED	RETURN
DECIDE WHEN ANY	FOR	ROLLBACK
DECIDE WHEN NONE	FORM	RULEVAR
DECIDE WHEN	FORMAT	RUN
DEFINE DATA CONTEXT	GET	RUN REPEAT
DEFINE DATA GLOBAL	GET SAME	RUN RETURN
DEFINE DATA INDEPENDENT	GET TRANSACTION	SELECT

DEFINE DATA LOCAL	GROUP BY	SEND
DEFINE DATA OBJECT	HAVING	SEND EVENT
DEFINE DATA PARAMETER	HISTOGRAM	SEND METHOD
DEFINE CLASS	HISTOGRAM VALUE	SEPARATE
DEFINE INITIAL	HISTOGRAM WHERE	SET CONTROL
DEFINE PRINTER	IF	SET GLOBALS
DEFINE REPORT	IF NO RECORDS	SET KEY
DEFINE SUBROUTINE	IF SELECTION	SETTIME
DEFINE WINDOW	IGNORE	SET WINDOW
DEFINE WORK	IMPORT	SETTIME
DELETE	INCLUDE	SHOW
DELETE FROM	INPUT	SKIP
DISPLAY	INPUT MARK	SORT
DIVIDE	INPUT MAP	STACK
DLOGON	INPUT TEXT	STACK COMMAND
DLOGOFF	INPUT WINDOW	STACK DATA
DO	INSERT	STOP
DOEND	INTERFACE	STORE
DOWNLOAD	INVESTIGATE	SUBTRACT
DRAW	LABEL	SUSPEND
EJECT	LIMIT	TERMINATE
ELSE	LOOP	TRANSFER
END	MAP	UPDATE
END TRANSACTION	METHOD	UPLOAD
END-ALL	MOVE	WHILE
END-BEFORE	MOVE ALL	WRITE
END-BREAK	MOVE BY NAME	WRITE PC

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END-BROWSE	MOVE BY POSITION	WRITE TITLE
END-CLASS	MOVE EDITED	WRITE TRAILER
END-DECIDE	MOVE INDEXED	WRITE WORK
END-DEFINE	MOVE LEFT	
END-ENDDATA	MOVE RIGHT	
END-ENDFILE	MOVE ROUNDED	

There are some generic level Search Keywords available that can be specified, which allow you to include related keywords. This allows you to specify a range of related keywords as one single criteria and Impact Analysis will then identify all related keywords.

These Search Keywords can be identified by a '?' at the end of the keyword. For example:

1. A Search Keyword of 'DEFINE ?' will identify the following keywords:

- DEFINE DATA CONTEXT
- DEFINE DATA GLOBAL
- DEFINE DATA INDEPENDENT
- DEFINE DATA LOCAL
- DEFINE DATA OBJECT
- DEFINE DATA PARAMETER
- DEFINE CLASS
- DEFINE INITIAL
- DEFINE PRINTER
- DEFINE REPORT
- DEFINE SUBROUTINE
- DEFINE WINDOW
- DEFINE WORK

2. A Search Keyword of 'DEFINE DATA ?' will identify the following keywords:

- DEFINE DATA CONTEXT
- DEFINE DATA GLOBAL
- DEFINE DATA INDEPENDENT
- DEFINE DATA LOCAL
- DEFINE DATA OBJECT
- DEFINE DATA PARAMETER

3. A Search Keyword of DEFINE DATA GLOBAL will only identify DEFINE DATA GLOBAL keywords.

Special Search Value for Search Keyword IF

For the Search Keyword 'IF', a special Search Value of 'IS(format)' can be specified. This search value will impact any usage of the IS option within an IF statement.

Note: The IS option can be used to check whether the content of an alphanumeric field can be converted to a specific other format. For example, the IS option can be used to check the content of a field before the mathematical function VAL (extract numeric value from an alphanumeric field) is used to ensure that it will not result in a runtime error.

The search value IS(format) is specified in the search value field on the Impact Criteria screen and is only valid with the search keyword IF, where '(format)' is the desired format and length. Examples of possible search values are:

IS(N7)
IS(I002)
IS(D)

For Example:

```
::::
0090 DEFINE DATA LOCAL
0100 01 #ALPHA           (A7)
0110 01 #NUMERIC        (N7)
0120 END-DEFINE
::::
0250 IF #ALPHA IS(N5)
0260   COMPUTE #NUMERIC := VAL(#ALPHA) * 1
0270   WRITE #NUMERIC
0280 END-IF
::::
```

Using Impact criteria of search keyword 'IF' and search value 'IS(N5)' would provide Impact results for statement line number 0250.

Combination Keywords

These are special keywords that perform predefined functions.

- ADJUST
- APPLICATION STANDARDS
- CODE OPTIMIZATION
- CODE RESTRUCTURING
- INTERNATIONALIZATION
- MULTI SEARCH
- MVS NAT22 TO31
- NATRPC
- OBJECT BUILDER
- PORTING

Note: For more information on each of the combination keywords refer to Chapter 3 [Combination Search Keywords](#).

Miscellaneous Keywords

These are additional Search Keywords that will identify all instances of non database data items (fields), Database data items (fields), DDMs, data item definitions (format and length), labels used for processing loops and literal strings within objects.

The miscellaneous keywords are:

1. [DATAITEM](#)
2. [DBFILE](#)
3. [DEFINITION](#)
4. [LABEL](#)
5. [LITERAL](#)

DATAITEM

This allows the user to search for any non-database field. The full value or a partial value, of the data item to be searched for, is specified in the Search Value field. Partial values can be input using wild card '?'. For example:

- #ABC Will search for data items named #ABC
- #ABC? Will search for all data items starting with #ABC
- ?#ABC? Will search for all data items containing #ABC
- ?#ABC Will search for all data items ending with #ABC

DBFILE

This allows the user to search for any DDM and database field. The full value or a partial value, of the DDM to be searched for is specified in the Keyword Value field. Partial values can be input using wild card '?'. For example:

- FILE1 Will search for all DDMs named FILE1
- FILE? Will search for all DDMs starting with FILE
- ?FILE? Will search for all DDMs containing FILE
- ?FILE Will search for all DDMs ending with FILE

Note: Specifying '?' on its own in the Keyword Value field, will result in all DDMs being searched for.

The full value or a partial value of the database field to be searched for is specified in the Search Value field. Partial values can be input using wild card '?'. For example:

For example:

- NAME Will search for all database fields named NAME
- NAME? Will search for all database fields starting with NAME
- ?NAME? Will search for all database fields containing NAME
- ?NAME Will search for all database fields ending with NAME

Note: Specifying '?' on its own in the Search Value field, will result in all database fields being searched for.

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Note: The DBFILE process does not identify any database fields that are used on a Map. This is because they are actually defined as Parameter Data within the map itself. These can be identified by using the DATAITEM search keyword.

The following Figure 1-5 illustrates the database fields defined within a map.

```

0010 * MAP2: PROTOTYPE          --- CREATED BY WNT 4.1.0 ---
0020 * INPUT USING MAP 'XXXXXXX'
0030 *      #C-ADDRESS #C-ARRIVED #C-DOB #C-DUE-FOR-SURGERY #C-FIRST-NAME
0040 *      #C-PATIENT-ID #C-RELEASED #C-SURNAME #G-MESSAGE #M-MAP-HEADING
0050 *      #M-UNDERLINE PATIENT.ADDRESS(*) PATIENT.ARRIVED PATIENT.DOB
0060 *      PATIENT.DUE-FOR-SURGERY PATIENT.FIRST-NAME PATIENT.PATIENT-ID
0070 *      PATIENT.RELEASED PATIENT.SURNAME
0080 DEFINE DATA PARAMETER
0090 1 #C-ADDRESS (C)
0100 1 #C-ARRIVED (C)
0110 1 #C-DOB (C)
0120 1 #C-DUE-FOR-SURGERY (C)
0130 1 #C-FIRST-NAME (C)
0140 1 #C-PATIENT-ID (C)
0150 1 #C-RELEASED (C)
0160 1 #C-SURNAME (C)
0170 1 #G-MESSAGE (A070)
0180 1 #M-MAP-HEADING (A040)
0190 1 #M-UNDERLINE (A040)
0200 1 PATIENT.ADDRESS (A030/00001:00004)
0210 1 PATIENT.ARRIVED (A020)
0220 1 PATIENT.DOB (N06.0)
0230 1 PATIENT.DUE-FOR-SURGERY (A006)
0240 1 PATIENT.FIRST-NAME (A020)
0250 1 PATIENT.PATIENT-ID (N07.0)
0260 1 PATIENT.RELEASED (D)
0270 1 PATIENT.SURNAME (A020)
0280 END-DEFINE

```

Figure 1-5 Database fields defined within a map

DEFINITION

This option allows for the searching of a format and length or a range of format and lengths within the objects. The data is entered as a format type and length and with a range this is repeated with a '-' (hyphen) between the values.

For example:

- A001 Will locate all one-byte alphanumeric data items.
- A001-A010 Will locate all alphanumeric data items with a length greater than or equal to one and less than or equal to ten.

LABEL

The label search is used to locate references to all labels defined in objects.

LITERAL

The literal search locates all text and numeric constants in objects, as well as edit mask definitions. The literal can be specified in full or a partial value can be used. Partial values can be input using wildcards '?'.

For example:

- Hello? Will search for all literal strings starting with Hello
- ?Hello Will search for all literal strings ending with Hello
- ?Hello? Will search for all literal strings containing Hello
- Hello Will search for all literal strings named Hello

Note: When this Search Keyword is selected, further refinement options become available by using the 'Options' button on the Impact Criteria screen. For more information on these refinement options refer to the section [Literal Options window](#).

Forward/Backward Tracking

Forward/Backward tracking can be used to control the tracking direction for a variable, when using search keyword MULTISEARCH or the search keywords DATAITEM, DBFILE or DEFINITION (which make use of the consistency option).

Forward/Backward tracking is controlled by the TRACKING parameter in the NATENG.INI file.

Note: For more information on NATENG.INI file parameter TRACKING refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Forward tracking will track the forward direction of a variable showing all the derivatives being populated from the variable.

Backward tracking will track the backward direction of a variable showing all the derivatives that have populated the variable.

Forward/Backward tracking affects any statements using the following Natural Keywords:

- MOVE
- ASSIGN
- MOVE BY NAME
- ASSIGN ROUNDED
- MOVE LEFT
- MOVE RIGHT
- MOVE ROUNDED

Example of Forward/Backward Tracking

The following example uses a search keyword of DATAITEM, with a search value of #A and Consistency switched on. Results for each of the tracking options is then described.

Sample Source Code:

```
::::  
0110 MOVE #A TO #B  
0120 IF #A > #C  
0130   WRITE 'HELLO'  
0140 END-IF  
0150 MOVE #D TO #A  
0160 END
```

1. Forward tracking will result in:

- #A at statement lines 0110, 0120 and 0150 being marked as 'Specified' matches.
- #B at statement line 0110 would be marked as 'Derived'.

2. Backward tracking will result in:

- #A at statement lines 0110, 0120 and 0150 being marked as 'Specified' matches.
- #D at statement line 0150 would be marked as 'Derived'.

3. Normal tracking will result in:

- #A at statement lines 0110, 0120 and 0150 being marked as 'Specified' matches.
- #B at statement line 0110 would be marked as 'Derived'.
- #C at statement line 0120 would be marked as 'Derived'.
- #D at statement line 0150 would be marked as 'Derived'.

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Keyword Options Window

The Keyword Options screen is invoked using the Keyword Value ‘**Options**’ button from the Impact Criteria screen. It provides the facility to add further refinement options for select Search Keywords. There are two main levels of refinement options available:

1. Specify Sub Keywords.

Sub Keywords represent the optional clauses that can be used with a Natural Keyword. The following Natural Keywords are supported:

COMPOSE	FIND	SEND
STACK		

2. Allow the use of call name mask values specified in Keyword Value.

Call names can be specified as a Keyword Value using a full or partial call name, or, as a mask value. If a mask value is used then the refinement option needs to be specified to indicate that the call name is a mask value.

Note: Impact will only match call names that are coded as literal strings when using mask values.

The following Search Keywords are supported:

CALL ?	CALL	CALL FILE
CALL INTERFACE4	CALL LOOP	CALLNAT
FETCH ?	FETCH	FETCH REPEAT
FETCH RETURN	INPUT MAP	INVESTIGATE
OPEN DIALOG	RUN ?	RUN
RUN REPEAT	RUN RETURN	

The Keyword Options screen is a common screen, which is used for all the Search Keywords listed above, the only variation is the list of Sub Keywords. The Sub Keywords represent the optional clauses that can be added to a Search Keyword, and will only list the relevant optional clauses for the selected Search Keyword.

The following Figure 1-6 illustrates the Keyword Options screen.

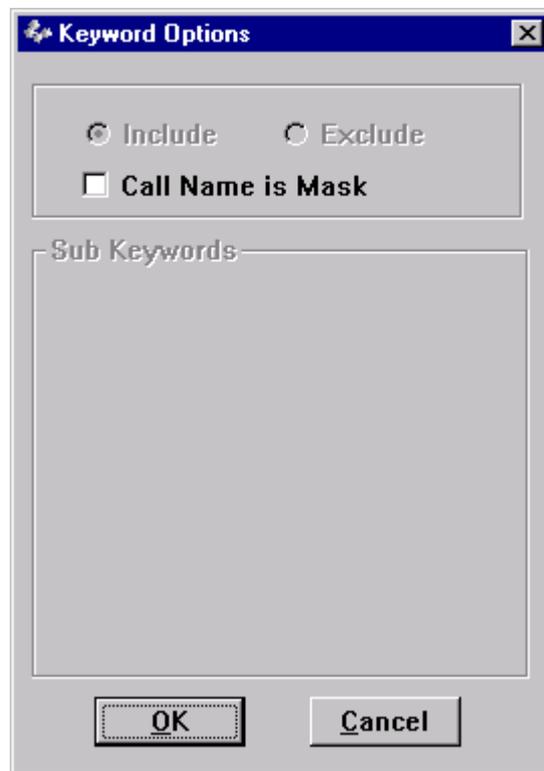


Figure 1-6 Keyword Options screen

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SCREEN ITEMS	DESCRIPTION
Include	Reserved for future use.
Exclude	Reserved for future use.
Call Name is Mask	<p>A tick in the check box indicates selection. If selected, this option identifies the call name used for the Keyword Value as a mask value.</p> <p>This option is only available for any Search Keywords that utilize call names, for example CALLNAT, FETCH and INPUT MAP.</p> <p>The mask value used must be specified using the following convention:</p> <p>. (period) Indicates a single position that is not to be checked.</p> <p>* (asterisk) Wildcard used to indicate that the last character position is to be checked by the following mask character.</p> <p> For example: *N will check the last character in a call name for a numeric digit.</p> <p>N The position is to be checked for a numeric digit.</p> <p>A The position is to be checked for an alphabetical character (upper or lower case).</p> <p>C The position is to be checked for an alphabetical character (upper or lower case), numeric digit or a blank.</p> <p>'c' One or more positions to be checked for the characters bound by apostrophes.</p> <p> For example: 'ABC' will check the call name to contain 'ABC'.</p> <p><i>Note: The maximum length for a mask value is 8 bytes.</i></p> <p>Examples:</p> <p>For the following code statements:</p> <p>0220 CALLNAT 'XX001P01' #PARM</p> <p>0350 CALLNAT 'XXN01' #FIELD-A #FIELD-B #RESPONSE</p> <p>1000 CALLNAT 'XXP01A'</p> <p>1550 CALNAT 'XXABCP1A'</p> <p>1600 CALLNAT 'ABCMAP&'</p> <p>A Search Keyword of CALLNAT is used with the following mask values used as Keyword Values:</p>

SCREEN ITEMS DESCRIPTION

Mask Value	Statement	Description
AANNNANN	0220	Checks for alphabetic characters in positions 1, 2 and 6. Checks for numeric digits in positions 3, 4, 5, 7 and 8.
.....N	0220	Ignore positions 1 to 7 and check for numeric digit in position 8.
*N	0220 0350	Check last position for numeric digit.
.....A	1550	Ignore positions 1 to 7 and check for alphabetic character in position 8.
*A	1000 1550	Check last position for alphabetic character.
..'ABC'...	1550	Check for the characters 'ABC' in positions 3, 4 and 5.
..'ABC'	1550	Check for the characters 'ABC' in positions 3, 4 and 5.
*'&'	1600	Check last position for '&'.

Sub Keywords

This will list the appropriate optional clauses for the Natural Keyword selected. The optional clauses available for each supported Natural Keyword are:

Natural Keyword	Optional Clauses
------------------------	-------------------------

COMPOSE	ASSIGNING EXTRACTING FORMATTING MOVING RESETTING
FIND	FIRST NUMBER UNIQUE RETAIN SORTED
SEND	EVENT METHOD
STACK	COMMAND DATA

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BUTTON NAME	DESCRIPTION
OK	Accepts the Keyword Options specified and returns back to the Impact Criteria screen.
Cancel	Cancels any Keyword Options specified and return back to the Impact Criteria screen.

Literal Options Window

The Literal Options screen is invoked using the Search Value ‘Options’ button from the Impact Criteria screen. This option is only available if the Search Keyword LITERAL is being used.

The following Figure 1-7 illustrates the Literal Options screen.

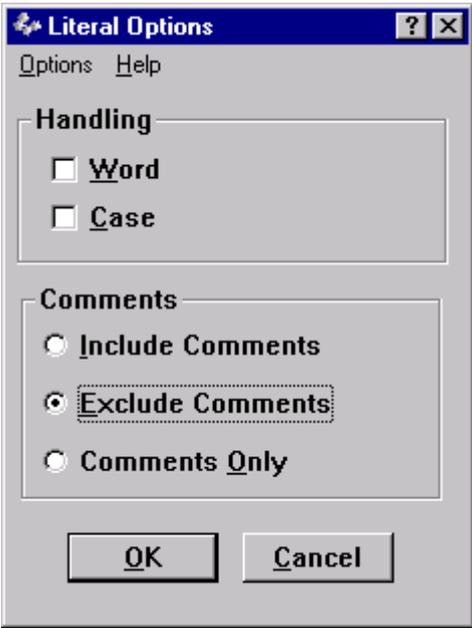


Figure 1-7 Literal Options screen

MENU ITEMS	OPTIONS	DESCRIPTION
Options	Close	Will close the Literal Options screen and return back to the Impact Criteria screen.
Help		Invokes the Impact Criteria help.

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SCREEN ITEMS	DESCRIPTION
--------------	-------------

Handling	<p>These options will specify the handling characteristics to be used for the literal search value that has been specified. Available selections are:</p> <p>Word This treats the literal text string as individual words and the search value is validated against each word. For Example: 'ADABAS and Natural', with 'Word' specified will validate the three values as separate entries against the search value.</p> <p>Therefore, if the search value was ADABAS and there were two literal text strings 'ADABAS and Natural' and 'An ADABAS Database', if WORD was specified then the two literal text strings would be impacted. If WORD was not specified then neither would be impacted.</p> <p>Case The Case option determines whether the search value entered is to be searched using the same upper and lower case format as used in literal text strings within the objects.</p> <p>Therefore, if the search value was 'Hello' and there were two literal text strings 'Hello' and 'HELLO', if CASE was specified then only 'Hello' would be impacted. If CASE was not specified then both would be impacted.</p>
Comments	<p>These options provide the handling options for literal strings within comment lines. Available selections are:</p> <p>Include Comments Will report any impacts found within comment lines.</p> <p>Exclude Comments Will ignore any impacts found within comment lines.</p> <p>Comments Only Will only report impacts found within comment lines.</p>

BUTTON NAME	DESCRIPTION
-------------	-------------

OK	Accepts the Literal Options specified and returns back to the Impact Criteria screen.
Cancel	Cancels any Literal Options specified and returns back to the Impact Criteria screen.

Impact Data Preparation

The Impact Data Preparation options provide the facility to prepare further pre-analysis data, which is referenced during the Impact execution. The Impact Data Preparation data is used in conjunction with any Impact Search Criteria that may have already been specified.

Any specifications made using the Impact Data Preparation options are applicable to the currently selected Impact Version.

The Impact Data Preparation option is accessed using the following menu navigation: Analysis➔Impact Data Preparation.

This provides a sub-menu with the following options:

1. [Impact Sets](#)
2. [Object Builder Processing](#)
3. [Application Standards](#)

Impact Sets

Impact Sets are a means of creating a sub-set of objects within an Application for a given Impact Version, which will allow impact to be executed against the specified Impact Set only. This means that impact can be executed against sets of objects within an Application without the need for creating individual applications containing the sub-sets of objects required.

Objects are selected from the ‘Select from’ list (on left-hand side of dialog) and are transferred to the ‘Selected’ list (on right-hand side of dialog).

Once all selections have been made, the objects now form the Impact set, which will be used during any subsequent Impact Executions for this version. Only objects within the Impact Set will be impacted. All other objects in the Application, but outside the Impact Set, will not be impacted.

If no Impact Set exists for an Impact version within an Application, then all the objects in the Application will be impacted.

Impact Sets Window

The Impact Sets window is accessed using the following menu navigation: Analysis → Impact Data Preparation → Impact Sets.

Note: The Impact Sets window can also be invoked by using the ‘Impact Sets’ button from the Impact Version screen. For more information on the Impact Version screen refer to the section [Impact Version](#).

The following Figure 1-8 illustrates the Impact Sets screen.

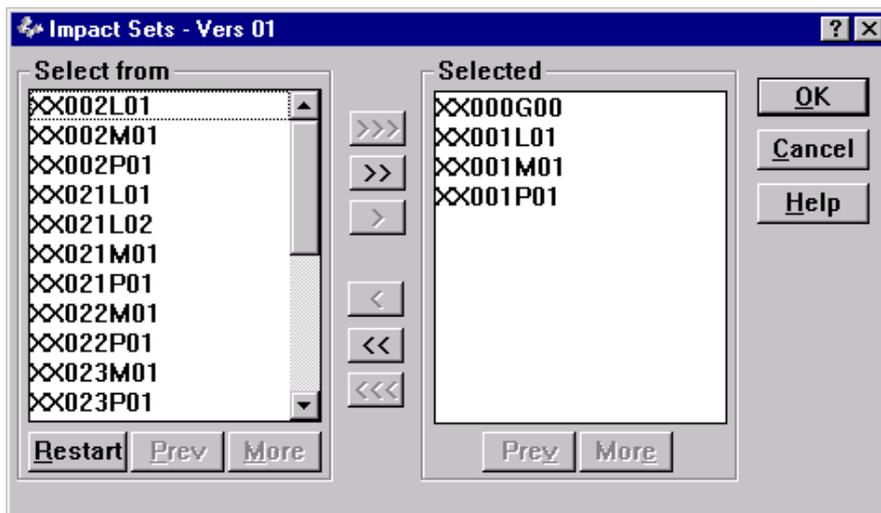


Figure 1-8 Impact Sets screen

SCREEN ITEMS	DESCRIPTION
Select from	List of objects loaded in the Repository for the current application
Selected	List of all the objects selected to form an Impact Set for this application.

BUTTON NAME	DESCRIPTION
Restart	If selected, allows a new start position for the select from list to be specified. For example: XX025P01 will cause the list to start displaying all objects from XX025P01 onwards.
Prev	Scrolls the object list to previous page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the object list to forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.

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BUTTON NAME	DESCRIPTION
>>>	Select all objects in 'Select From' list (when more than one page as set by the LISTBOXMAX parameter in the NATENG.INI file).
>>	Select all objects on this page in 'Select From' list.
>	Select all selected objects in 'Select From' list.
<	De-select all selected objects in 'Selected' list.
<<	De-select all objects on this page in 'Selected' list.
<<<	De-select all objects in 'Selected' list (when more than one page as set by the LISTBOXMAX parameter in the NATENG.INI file).

Note: Objects can also be selected or de-selected by using the left mouse button and double clicking.

OK	Accept the Impact Set selections and return back to the main Natural Engineer screen.
Cancel	Cancel any Impact Set selections made and return back to the main Natural Engineer screen..
Help	Invokes the Impact Sets help.

Note: For more information on the NATENG.INI file parameter LISTBOXMAX refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Object Builder Processing

The Object Builder Processing option provides the facility to set up Object Builder line range criteria, which are used during Impact execution. These criteria will appear in the Impact Search Criteria Summary screen and will have a type of 'OEM' denoted.

The setting up of Object Builder line range criteria using the Object Builder Processing option, is the same as using the Impact Criteria screen to add the Search Keyword 'OBJECT BUILDER' and specifying the line range in the Modification Parameters field. Impact execution treats both sets of criteria identically.

The Object Builder Processing method of specifying Object Builder line range criteria is easier to use, in that the object source code is displayed on the screen. The Impact Criteria method requires prior knowledge of the line ranges to be available, either from hardcopy listings or using the Natural editor.

Note: For more information on the Impact Search Criteria and the criteria type 'OEM', refer to the section [Impact Search Criteria](#).

Note: For more information on the Object Builder process refer to the Natural Engineer Application Restructuring for Windows manual.

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Object Builder Processing Window

The Object Builder Processing window is accessed using the following menu navigation: Analysis → Impact Data Preparation → Object Builder Processing.

The following Figure 1-9 illustrates the Object Builder Processing screen.

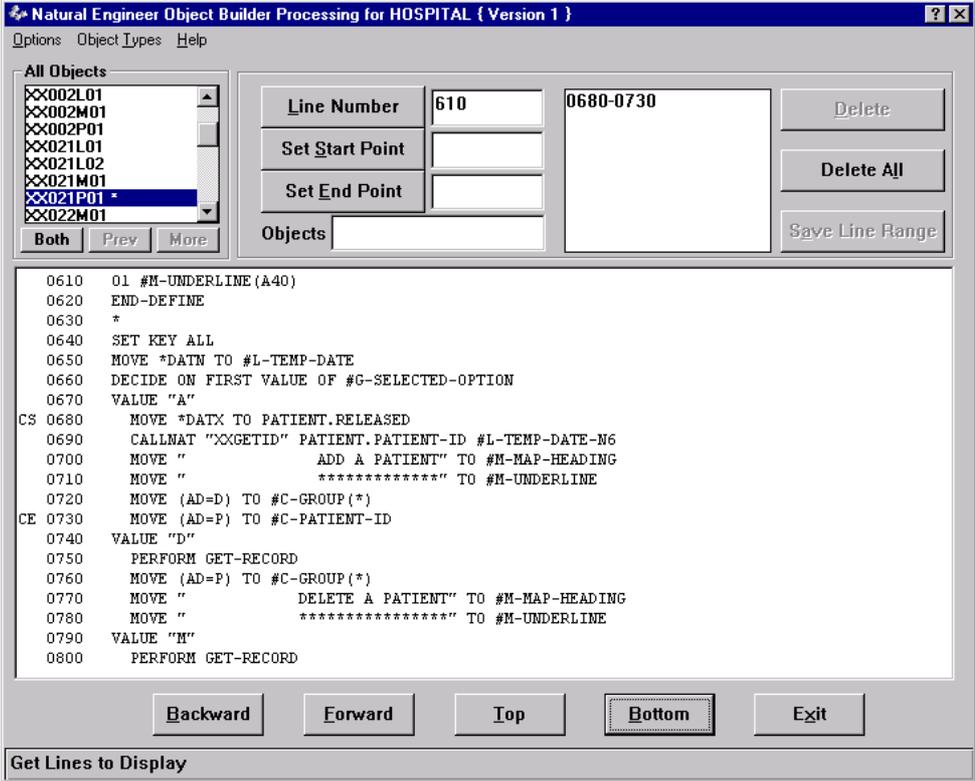


Figure 1-9 Object Builder Processing screen

MENU ITEMS	OPTIONS	DESCRIPTION
Options	Close	Will close the Object Builder Processing screen and return back to the main Natural Engineer screen.
Object Types		Allows you to select the Object Types to be listed. Available selections are: <ul style="list-style-type: none"> ▪ All objects ▪ Programs ▪ Maps ▪ Parameter Data Areas ▪ Global Data Areas ▪ Local Data Areas ▪ Copycodes ▪ Subprograms ▪ Subroutines ▪ Help routines
Help		Invokes the Object Builder Processing help.

SCREEN ITEMS	DESCRIPTION
Objects List	Lists all the objects in the application that have been loaded into the Repository. This list can be tailored to your requirements using the options in the Object Types menu. Objects can be selected using the left mouse button with a single click. Any objects that have had line ranges saved will show with an asterisk (*) to the right of the object name. For example: XX021P01 *.
Line Number	Will display the line number at top of the page currently being displayed.
Start Line Number	Will display the line number to be used for the start of line range.
End Line Number	Will display the line number to be used for the end of line range.
Objects	The generated PDA and Subprogram name overrides are input here. The format is pppppppp,ooooooo where: pppppppp is the name of the generated PDA. For example PDA01 and ooooooo is the name of the generated sub-program, for example SUB01. <i>Note: For more information refer to the section Modification Parameters.</i>
Selected Ranges	Will list all the line ranges and generated object name overrides that have been saved for an object.

SCREEN ITEMS	DESCRIPTION
Source Code	<p>Will display the selected objects source code. Any source code lines that are part of a saved line range will have the following in the first 2 bytes of the line:</p> <p>CS Indicates that the line is the start of a range.</p> <p>CE Indicates that the line is the end of a range.</p> <p><i>Note: If a single line has been selected for start and end ranges, e.g., 0100-0100, then the indicator will show only CS.</i></p>

BUTTON NAME	DESCRIPTION
Both	<p>This button provides additional refinement of the objects listed in the Objects List box. This button has three different states, with the button text changing accordingly:</p> <p>Both The default for the screen is to list all objects whether they have line ranges saved or not.</p> <p>OEM O Will only list objects that have line ranges saved, i.e., OEM data available.</p> <p>N OEM Will only list objects that have no line ranges saved, i.e., no OEM data available.</p>
Prev	<p>Scrolls the object list to previous page.</p> <p>This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.</p>
More	<p>Scrolls the object list to forward one page.</p> <p>This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.</p>
Line Number	<p>Enter a line number and select the Line Number button to display the source code in the text box starting from that line number.</p>
Set Start Point	<p>Place your cursor on a line and select the Set Start Point button. This will enter that line number in the Set Start Point box and will define the start line for the component, marking it as CS (Component Start) in the source code.</p>
Set End Point	<p>Place your cursor on a line and select the Set End Point button. This will enter that line number in the Set End Point box and will define the end line for the component, marking it as CE (Component End) in the source code.</p>

BUTTON NAME	DESCRIPTION
Delete	This will delete the line range selected in the right-hand box.
Delete All	This will delete all line ranges (components) in the right-hand box.
Save Line Range	Once you have set the Start and End points in the source code, select the Save Line Range button to save that component, and the line number range will display in the left-hand box.
Backward	Displays the previous page of the source code listing.
Forward	Displays the next page of the source code listing.
Top	Displays the first page of the source code listing.
Bottom	Displays the last page of the source code listing.
Exit	Closes the Object Builder Processing screen and returns back to the main Natural Engineer screen.

Note: For more information on the NATENG.INI file parameter LISTBOXMAX refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Application Standards

The Application Standards option allows for the specification of application standards that are to be used to override the default settings defined using the Global Standards option.

Application Standards are used as a criteria subset of Impact Analysis when using the search keyword APPLICATION STANDARDS and will report on how an application complies with acceptable Natural application standards.

The Application Standards option can be used to specify standards that may differ from the Global Standards for certain individual applications. A simple example of this may be legacy applications that were developed prior to any site coding standards being used, or, where existing site standards have been updated and the updated standards not applied to an application. In this situation the deviance can be catered for using the Application Standards option.

Once the Application Standards have been specified it is possible to save them as a PC file allowing each set of application standards to be reused. The file extension will be 'STD'. These files will default to the Natural Engineer DATA folder, the path is X:\PROGRAM FILES\SOFTWARE AG\NATURAL ENGINEER\4.4.2\DATA where X: is the drive on which Natural Engineer has been installed.

For more information on the Global Standards option refer to the Natural Engineer Administration Guide for Windows manual.

Application Standards Definition Window

All the specifications for Applications Standards are defined using the Application Standards Definition screen.

This is accessed by using the following menu navigation: Analysis → Impact Data Preparation → Application Standards from the main Natural Engineer screen.

The following Figure 1-10 illustrates the Application Standards Definition screen.

Application Standards Definition

File Options

Data Type Usage

- Alphanumeric
- Binary
- Attribute Control
- Date
- Floating Point
- Integer
- Logical
- Numeric (Unpacked)
- Packed Numeric
- Time

Environment

- Use Full Statement Syntax:
- Use Message File:
- Allow Rules in Maps:
- Structured Mode:
- Reporting Mode:

Data Item Specification and Usage

Data Item Name Length: 1

Local Data Item Start Character: #

Use Database Qualifiers:

Use Labels:

Allow Dynamic Variables:

Allow AIVs:

Use Reserved Words as Data Items:

Use of Hexadecimal:

Copycode

Allow Copycode:

Minimum Usage: 3

Object Comments

Description: 10

Percentage of Lines: 5 to 15

OK Cancel Help

Figure 1-10 Application Standards Definition screen

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MENU ITEMS	OPTIONS	DESCRIPTION
File	Open	Open a previously saved Application Standards file.
	Save As	Save the currently defined Application Standards.
	Standards Preferences	<p>Opens a sub-menu with two further options which influence the Impact execution:</p> <p>Preferences</p> <p>This option lists each of the Application Standards main options and is used as a control during Impact analysis as to which standards are to be analyzed.</p> <p><i>Note: Refer to the section Application Standards Preferences for more information on this option.</i></p> <p>Object Types</p> <p>This option lists all the object types, which can be selected and is used to refine the objects analyzed during Impact Execution.</p> <p><i>Note: Refer to the section Application Standards Object Types for more information on this option.</i></p>
Options	Exit Standards Labels/Data Manipulation	<p>Exits the Application Standards Definition screen.</p> <p>Opens a new screen offering further options, which relate to labels and data manipulation statements.</p> <p><i>Note: Refer to the section Application Standards Labels and Data Manipulation options for more information on this option.</i></p>

SCREEN ITEMS	DESCRIPTION
Data Type Usage	<p>Identifies Data Type usage. If data items are not checked then they will be reported as non-standard. Data Types available are:</p> <ul style="list-style-type: none"> ▪ Alphanumeric ▪ Binary ▪ Attribute Control ▪ Date ▪ Floating Point ▪ Integer ▪ Logical ▪ Numeric (Unpacked) ▪ Packed Numeric ▪ Time
Environment	<p>Identifies various environmental type options. Environment options are:</p> <p>Use Full Statement Syntax Standards allow for full syntax statements to be used, rather than partial syntax. (Not currently available.)</p> <p>Use Message File Standards allow for specifying the use of a message file for messages, rather than messages embedded in the objects.</p> <p>Allow Rules in Maps Standards allow for the use of rules in maps.</p> <p>Structured Mode If Structured Mode is selected, then the Application standard is to allow Structured Mode objects.</p> <p>Reporting Mode If Reporting Mode is selected, then the Application standard is to allow Reporting Mode objects.</p>
Data Item Specification and Usage	<p>Identifies standards specific to Data Items. Data Item Specification and Usage options are:</p> <p>Data Item Name Length A number from 1 to 32 can be selected. Natural Engineer will identify data items that exceed this number.</p> <p>Local Data Item Start Character The first character required for locally defined data items.</p> <p>Use Database Qualifiers Database data items must have the associated database qualifier name.</p> <p>Use Labels Statements that can have labels must use labels.</p>

SCREEN ITEMS	DESCRIPTION
	Allow Dynamic Variables Dynamic variables, such as &variables are permitted by standards.
	Allow AIVs Application Independent Variables are permitted by the standards.
	Use Reserved Words as Data Items If selected, data item names may also be reserved words.
	Use of Hexadecimal If selected, hexadecimal code is permitted by standards.
Copycode	Identifies standards for usage of copycode. Copycode options are: Allow Copycode If selected, applications may use Copycode objects. Minimum Usage This can be set between 0 and 99 and standards will report any copycodes that are not referenced that number of times.
Object Comments	Identifies standards for comments within an object. Object Comments options are: Description This can be 0 to 100 and requires at least that many comment lines at the start of the object. Percentage of Lines This is a percentage range from 1 to 100, which specifies the comment number standard as required to fall within that range.

BUTTON NAME	DESCRIPTION
OK	Saves the selections made and returns back to the main Natural Engineer screen.
Cancel	Cancels any inputs made and returns back to the main Natural Engineer screen.
Help	Invokes the Global Standards help.

Application Standards Preferences

The Application Standards Preferences option allows the user to limit which standards are actually checked for during Impact execution.

The Application Standards Preferences are accessed from the Applications Standards Definition screen using the menu navigation: File→Standards Preferences→Preferences.

The Following Figure 1-11 illustrates the Standards Preferences screen.

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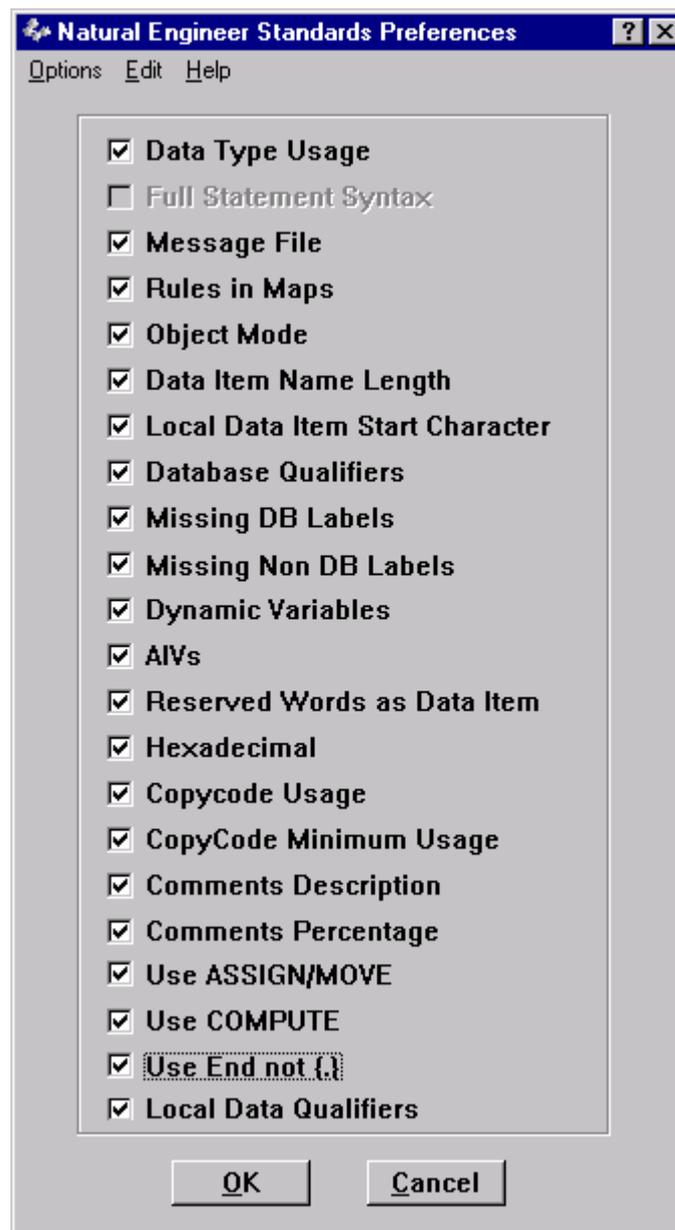


Figure 1-11 Standards Preferences screen

MENU ITEMS	OPTIONS	DESCRIPTION
Options	Close	Closes the Standards Preferences window and returns to the Application Standards Definition screen.
Edit	Select All	Selects all the Standards.
	Deselect All	De-selects all the Standards.
Help		Invokes the Application Standards help.

SCREEN ITEMS	DESCRIPTION
Standards	<p>Each standard is listed. A tick in the check box next to each standard indicates that the standard will be checked for. If a check box is blank then that standard will not be referenced during Impact execution. The standards list shows:</p> <ul style="list-style-type: none"> ▪ Data Type Usage ▪ Full Statement Syntax ▪ Message File ▪ Rules in Maps ▪ Object Mode ▪ Data Item Name Length ▪ Local Data Item Start Character ▪ Database Qualifiers ▪ Missing DB Labels ▪ Missing Non DB Labels ▪ Dynamic Variables ▪ AIVs ▪ Reserved Words as Data Items ▪ Hexadecimal ▪ Copycode Usage ▪ Copycode Minimum Usage ▪ Comments Description ▪ Comments Percentage ▪ Use ASSIGN/MOVE ▪ Use COMPUTE ▪ Use END not {,} ▪ Local Data Qualifiers

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BUTTON NAME	DESCRIPTION
OK	Saves the selections made and returns back to the Application Standards Definition screen.
Cancel	Cancels any inputs made and returns back to the Application Standards Definition screen.
Help	Invokes the Application Standards help.

Application Standards Object Types

The Application Standards Object Types option allows the user to limit which objects are actually checked for during Impact execution.

The Application Standards Object Types are accessed from the Application Standards Definition screen using the menu navigation: File→Standards Preferences→Object Types.

The Following Figure 1-12 illustrates the Standards Object Types screen.

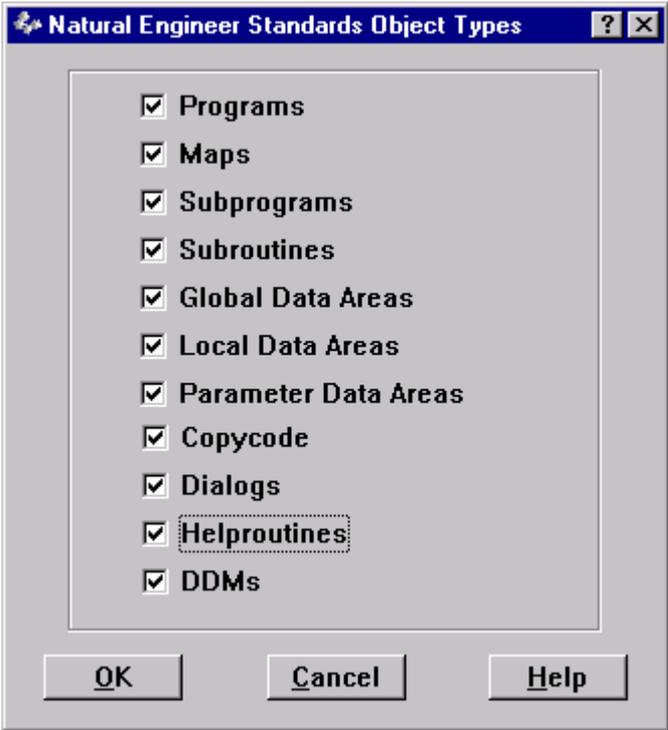


Figure 1-12 Standards Object Types screen

SCREEN ITEMS	DESCRIPTION
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Object Types	<p>Each object is listed. A tick in the check box next to each object type indicates that the object type will be checked for. If a check box is blank then that object type will not be referenced during Impact execution. The object types list shows:</p> <ul style="list-style-type: none"> ▪ Programs ▪ Maps ▪ Subprograms ▪ Subroutines ▪ Global Data Areas ▪ Local Data Areas ▪ Parameter Data Areas ▪ Copycode ▪ Dialogs ▪ Helproutines ▪ DDMs
---------------------	---

BUTTON NAME	DESCRIPTION
-------------	-------------

OK	Saves the selections made and returns back to the Application Standards Definition screen.
Cancel	Cancels any inputs made and returns back to the Application Standards Definition screen.
Help	Invokes the Application Standards help.

Application Standards Labels and Data Manipulation Options

The Application Standards Labels and Data Manipulation options allow further standards to be checked for during Impact execution.

The Application Standards Object Types are accessed from the Application Standards Definition screen using the menu navigation: Options → Standards Labels and Data Manipulation.

The Following Figure 1-13 illustrates the Standards Labels and Data Manipulation options screen.

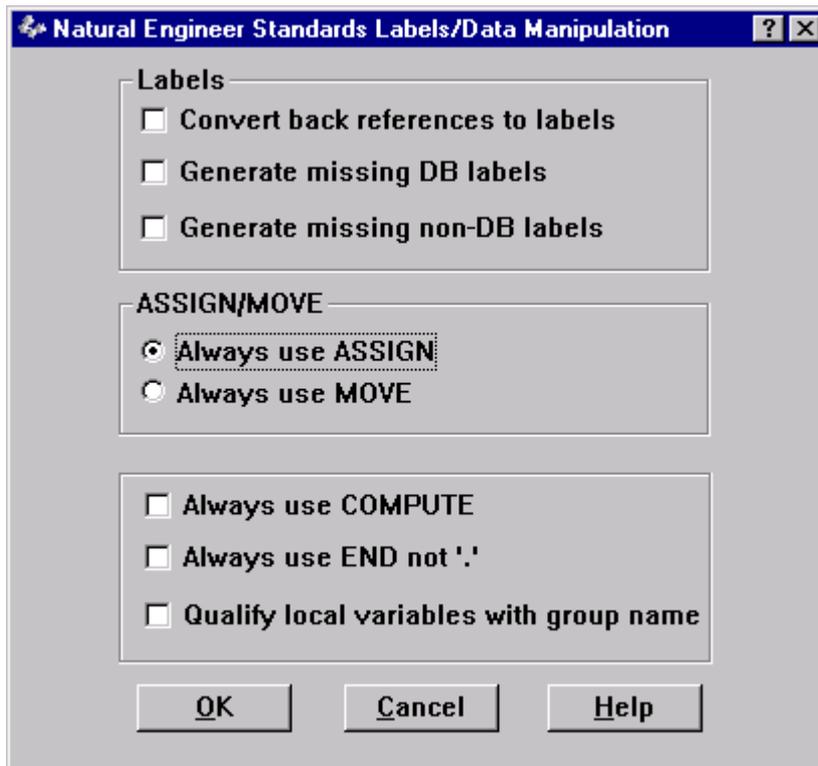


Figure 1-13 Standards Label and Data Manipulation options screen

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SCREEN ITEMS	DESCRIPTION
Labels	<p>Identifies various label options. These options will generate modification details after impact execution, i.e., the modification option can be executed to add labels and/or convert back references. Label options are:</p> <p>Convert back references to labels Identifies back references, which can be converted to labels.</p> <p><i>Note: When this option is selected, the Generate missing DB labels and Generate missing non-DB labels options are automatically selected. The Convert back references to labels option relies on these to create the labels first.</i></p> <p>Generate missing DB labels Identifies any Database access statements, which have no labels, associated with them. For Example: READ, FIND or HISTOGRAM.</p> <p>Generate missing non-DB labels Identifies any non-Database access statements which have no labels associated with them. For Example: FOR and REPEAT loops.</p>
ASSIGN/MOVE	<p>Identifies the use of ASSIGN or MOVE statements. ASSIGN/MOVE options are:</p> <p>Always use ASSIGN Any MOVE statements are located and reported.</p> <p>Always use MOVE Any ASSIGN statements are located and reported.</p>

SCREEN ITEMS	DESCRIPTION
Miscellaneous	<p>Identifies standards for miscellaneous options. Miscellaneous options are:</p> <p>Always use COMPUTE Any ASSIGN statements containing arithmetic constructs are located and reported. For Example: ASSIGN #TOTAL = #NET-TOTAL + 1</p> <p>Always use END not {,} Any use of ‘.’ as the END statement is located and reported.</p> <p>Qualify local variables with group name Any local variables that are defined within a group and have no group name qualifier are located and reported. For Example: 0100 01 #TAX-GROUP 0110 02 #TAX-RATE (N1.5) 0120 02 #TAX-RATE2 (N3) ::: 0300 COMPUTE #TOTAL-PAY = #ITEM-COST * #TAX-RATE #TAX-RATE at line number 0300 would be reported as it should have the group high level qualifier #TAX-GROUP prefix, i.e., #TAX-GROUP.#TAX-RATE.</p>
BUTTON NAME	DESCRIPTION
OK	Saves the selections made and returns back to the Application Standards Definition screen.
Cancel	Cancels any inputs made and returns back to the Application Standards Definition screen.
Help	Invokes the Application Standards help.

Impact Execution

The Impact Execution option invokes the Impact process, which will execute the Impact Search Criteria against the application code held in the Repository.

Each search criteria is checked against every element of the Repository. If 'Consistency' has been selected for the criterion, every impact found is then re-processed against the code in order to find the impacts of the impacts, using every left-right argument. This tracing process continues through the code until no further impacts or related impacts are found.

The number of times these Iterations occur can be limited by using the Maximum Iterations setting found in the Impact Search Criteria Summary screen.

Note: For more information on the number of iterations refer to the section [Maximum Iteration](#).

This is accessed by using the following menu navigation: Analysis → Impact Execution from the main Natural Engineer screen. When this option is selected, a confirmation window is displayed showing the Impact Version to be used. This allows you to cancel the execution if the wrong version is referenced.

The following Figure 1-14 illustrates the Impact Execution confirmation window.

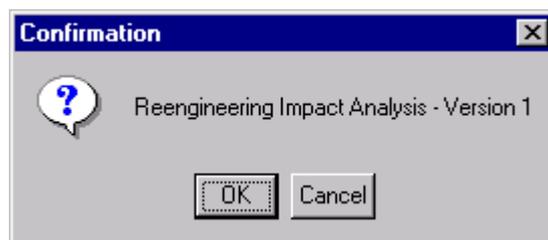


Figure 1-14 Impact Execution confirmation window

BUTTON NAME	DESCRIPTION
OK	Invokes Impact Execution.
Cancel	Cancels Impact Execution.

Impact Element Maintenance

The Impact Element Maintenance option provides the facility to review the results of the last executed Impact Analysis for the currently selected version. All impacted objects within an application are available for selection, once selected the impacted data items within the object are listed.

The impacted data items can be selected to reveal the source code context within the object and the impact match reason showing why the data item has been impacted. The context of the data item within the data definitions of the selected object are also shown.

The impacted data items within an object can also be viewed in a Browser.

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Impact Element Maintenance Window

The Impact Element Maintenance window is accessed by using the following menu navigation: Analysis → Impact Element Maintenance from the main Natural Engineer screen.

The following Figure 1-15 illustrates the Impact Element Maintenance screen.

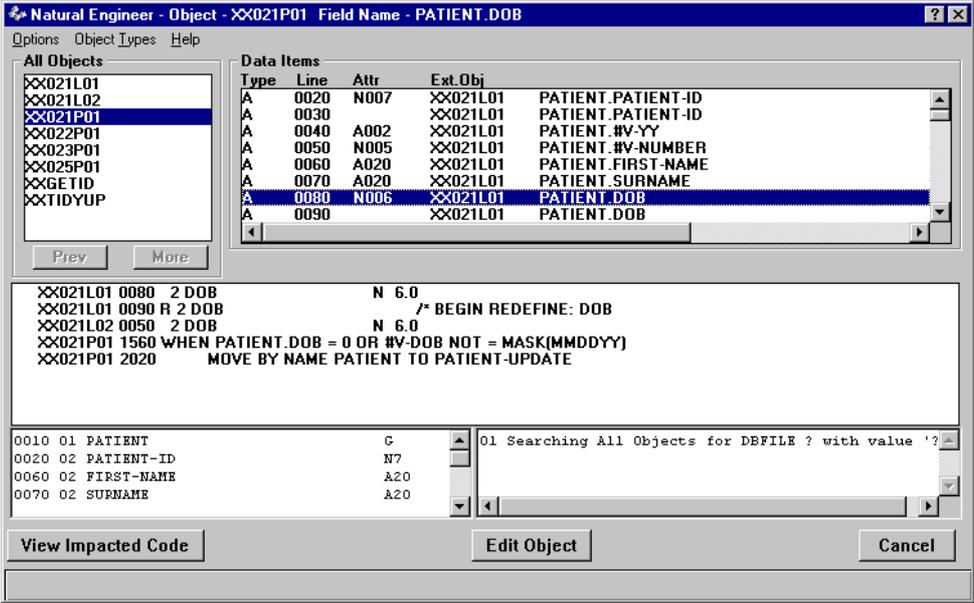


Figure 1-15 Impact Element Maintenance

MENU ITEMS	OPTIONS	DESCRIPTION
Options	Change Start Position of Object List	Allows the Object List to be restarted from a particular object.
	Remove Impacts and Links for Data Item	This facility removes the impacts for the selected data item and ALL impacts that have taken place because of the selected data item. This allows users to manipulate the impact set without having to re-execute impact analysis.
	View Structure Diagram for Search Criteria	Will invoke GenTree Structure Analyzer to display the impacts made for the specified search criteria, either within one selected object or, all impacted objects within an application. <i>Note: For more information on GenTree refer to Chapter 2 in the Natural Engineer Reporting manual.</i>
	Close	Closes the Impact Element Maintenance screen and returns back to the main Natural Engineer screen.
Object Types		Allows you to select the Object Types to be listed. Available selections are: <ul style="list-style-type: none"> ▪ All objects ▪ Programs ▪ Maps ▪ Data Defn. Modules ▪ Parameter Data Areas ▪ Global Data Areas ▪ Local Data Areas ▪ Copycodes ▪ Subprograms ▪ Subroutines ▪ Helproutines ▪ Dialogs ▪ Classes
Help		Invokes the Impact Element Maintenance help.

SCREEN ITEMS	DESCRIPTION
Object List	The objects that are impacted are listed in the left-hand list-box. If you select an object, a list of data items are listed in the right-hand list-box, which have been identified as impacted by the Search Criteria.
Data Items	All the impacted items within an object are listed here. Each data item can be selected to show further details in the object details, element context and impact reason list boxes. <p>Type This is a 2-byte value, which denotes the type of impact. <i>Note: For more information on type of impact refer to the section Impact Types.</i></p> <p>Line Line number in the object where the Impact was identified.</p> <p>Attr The definition of the item, if appropriate.</p> <p>Ext. Obj The name of the object that contains the item as impacted e.g., external Local Data Area with a Data Item definition.</p> <p>Element Name The name of the data items impacted within the selected object.</p>
Object Details	This section will display all the references of the selected data item for the selected object. These details are organized in the following columns: <p>Manual Source Code indicator If any manual source code changes are available than this column is marked with an 'X' <i>Note: Manual source code changes will have a data item of 'SOURCE CODE' present.</i></p> <p>Object Name The name of the object in which the Impact is identified.</p> <p>Line Number The statement line number of the code that is identified as impacted.</p> <p>Statement The statement code which is impacted.</p>
Element Context	This section displays the context of the element within the data definitions of the selected object. Details are only shown if applicable to the data item selection.
Impact Reason	This section displays information on the reasons for the impact based on the search criteria specified.

BUTTON NAME	DESCRIPTION
Prev	Scrolls the object list to previous page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the object list to forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
View Impacted Code	Display the impacts within an object using the Browser. The whole object source code will be displayed with the impacted items highlighted using the colors set by the SPECIFIED, DERIVED and EXCLUDED parameters in the NATENG.INI file.
Edit Object	Invokes the Natural editor for the object that has been selected. Natural Engineer will be closed down. The Natural editor that is invoked will depend on the object type of the selected object, e.g., if a program object has been selected, then the program editor will be invoked.
Cancel	Will close the Impact Element Maintenance screen and return back to the main Natural Engineer screen.

Note: For more information on the NATENG.INI file parameters LISTBOXMAX, SPECIFIED, DERIVED and EXCLUDED refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Impact Types

The following table shows all of the available impact types by criteria group:

Type	Description
Standard	
I	Data Item.
ID	Data Item - Derived fields.
M	Database Access.
A	Database File and Field.
AD	Database File and Field - Derived fields.
K	Keyword.
T	Literal.
TC	Literal comments.
R	Code Restructuring.
Q	Definition.
QD	Definition - Derived fields.
S	Source code change.
Object Builder	
G	Object Builder Line Range.
P	Object Builder Field Element.
V	Object Builder View Used.
C	Object Builder Initial/Temporary Impact.
X	Object Builder field external to line range referencing a line within the line range.
Y	Object Builder Escape Routine.
GK	Object Builder Presentation Line Range.
PK	Object Builder Presentation Field.
GT	Object Builder Technical Line Range.

Type	Description
------	-------------

Code Optimization

OL	Literal Move Length Mismatch.
OD	DECIDE ON statements using system variables.
OW	READ WORK FILE statement requiring RECORD clause.
OP	PE Group occurrences at group level.
OM	MOVE INDEXED statements.
OF	REPEAT/FOR loops using literal strings.
OU	Unused dataitems.
OS	STACK COMMAND statements with embedded data.
OG	Unused Global Variables.

Internationalization

Z	Double bytes on Maps.
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Application Standards

HA	Percentage of Object Comment Lines.
HB	Incorrect Object Mode.
HC	Copycode use not allowed.
HD	Local Data Item Start Character.
HE	Data Type Usage.
HF	Hexadecimal use not allowed.
HG	Data Item Name Length.
HH	AIV use not allowed.
HI	Dynamic Variable use not allowed.
HJ	Reserved Words as Data Items not allowed.
HK	Object Comment Description.
HL	Message File use not allowed.
HM	Processing Rules in Maps not allowed.
HN	Minimum Copycode use.
HO	Convert Back References to Labels.
HP	Data Item Name GT 32 characters.

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Type	Description
HQ	Missing non-DB Labels.
HR	Always Use ASSIGN.
HS	Always Use MOVE.
HT	Always Use COMPUTE.
HU	Copycode usage LT minimum.
HV	Qualify Local Variables with Group Name.
HW	Copycode not in library.
HX	Always use END.
HY	Missing DB Labels.
Adjust	
J	Adjust.
Natural version 2.2-3.1 Conversion	
3a	Redefinition of DB Arrays.
3b	DEFINE WINDOW Minimum Size.
3c	DIVIDE and Decimal Positions. The actual DIVIDE statement.
3h	DIVIDE and Decimal Positions. The Data Definition affected.
3d	Comparison Logic for Mu's in FIND..WITH.
3e	Empty Statement Blocks. IGNORE inserted into empty statement block.
3@	Empty Statement Blocks. Empty Statement block commented out and maximum variable value inserted.
3g	No uppercase translation for *COM.
3I	Results of SIN, COS and TAN functions.
3j	More precise SQRT Function Results.
3k	Assignments of Numbers with Decimals to Time Fields.
3l	MOVE RIGHT JUSTIFIED where target field is smaller than source field.

Type	Description
3m	Negative Values to Date Fields.
3n	More precise results for Floating Point Conversions and computation of floating point exponentiation.
3o	Comparison and Assignment of Variable Array Ranges.
3p	NAT1117 and NAT0924 replaced by NAT0082.
3q	Obsolete Error Messages.
3r	Changed System Variable *TPSYS under BS2000.
3s	Priority of PRINT/WORK FILE Statements.
3t	Usage of User Exit Modules Copies from SYSEXT.
3u	Internal Handling of AD=O.
3v	EJECT Statement Required Operand LESS.
3w	ESCAPE not Valid AT START OF DATA. ESCAPE TOP and ESCAPE BOTTOM not allowed in ON ERROR blocks.
3x	Decimal Digits of Constant Values.
3y	NEWPAGE Statement Required Operands LESS/TOP.
3z	PRINT Statement LS Parameter invalid.
31	BEFORE BREAK within IF condition invalid.
32	SUBSTRING clause, where the offset plus the length of the substring must not exceed the length of the field.
33	MOVE BY NAME statement where redefinition of alpha fields to numerics exist and both source and target numeric field are same length.
Natural RPC	
4A	Natural keyword FETCH prohibited.
4B	Natural keyword RUN prohibited.
4C	Natural keyword INPUT prohibited.
4D	Natural keyword STOP works the same as ESCAPE ROUTINE.
4E	Natural keyword TERMINATE works the same as ESCAPE ROUTINE.

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Type	Description
Porting	
6A	Alpha variables with redefinition variables defined using formats Binary, Integer or Packed.
6B	Numeric variables that are moved to Alpha variables.

Impact Analysis Inventory

The Analysis Inventory consists of a set of Impact Reports, which provide various types of information concerning the Impact Analysis, including a view of used Search Criteria. Reports are available at the summary, object and detailed data item levels.

The information provided by the Impact reports complements the information found in the Impact Element Maintenance screen.

The Impact Reports can be accessed using the following menu navigation: Analysis → Impact Reports.

The following list illustrates the Impact Reports that are available:

- Search Criteria
- Application Impact Summary
- Object Impact Summary
- Impacted External: Objects
- Impacted External: Interfaces
- Impacted Construct Models
- Impacted Predict Case Components
- Data Item Impact Inventory
- Data Item Impact Steplib Inventory
- Data Item Impact Usage Inventory
- View Impacted Source Code

The Impact Reports option becomes available after Impact Execution has been run.

Note: For more information on the Impact Reports refer to Chapter 3 in the Natural Engineer Reporting manual.

MODIFICATION PROCESSES

Chapter Overview

The Modification processes provide all the facilities to modify object source code for the objects within an application held on the Repository. The Modification process relies on the Analysis information generated by the Impact execution and is controlled by the Impact Version process.

Once Modification has been executed, there are various reporting options to view the results either online or using textual reports.

All the Modification processes are available from the Modification menu.

The topics covered in this chapter:

1. [Modification Preferences](#)
2. [Modification Element Maintenance](#)
3. [Execute Modification for All Objects](#)
4. [Modification Inventory](#)

Modification Preferences

The Modification Preferences option is used to specify override TLMs for an application and is accessed from the Modification menu.

TLMs are Natural objects with an object type of Text, containing the required processing code to be used during modification. They need to exist on either the modification library specified in the application preferences or, can be held on the Natural SYSTEM library.

After the override TLMs have been saved, they need to be defined using the Modification Preferences option in order that Natural Engineer can recognize them and use them during the modification process.

When override TLMs are specified for an application, they will override any site wide TLM settings that are in place, across all versions for the currently selected application.

Note: Site wide TLMs are specified using the Default Text Logic Members option found using the following menu navigation: Options → Administration → Default Text Logic Members.

For more information on the Default Text Logic Members option refer Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Supplied Sample Text Logic Members

Natural Engineer comes supplied with three Text Logic Member (TLM) objects that can be adapted and used for the Modification Preferences option.

The sample TLMs supplied are:

1. TLMSTART
2. TLMCOM
3. TLMAFTER
4. TLMDYNAM

Note: These objects can be found on the Natural Engineer SYSNEE library and will need to be moved to either SYSTEM or modification libraries as required. If moved to the SYSTEM library, they will be available to all modification libraries.

New TLMs can be generated and added to the required Natural library and their usage must correspond to the TLM types that are available.

TLMSTART

This is an example 'Start' TLM. It may be used for Structured Mode or Reporting Mode objects.

```

0010 * -----
0020 * TLMSTART - START
0030 * -----
0040 FORMAT PS=24 LS=132
0050 * -----
0060 * TLMSTART - END
0070 * -----

```

This will get inserted before the first line of procedural code in an object e.g., after the definitions in a Structured Mode program.

TLMCOM

This is an example 'Comment' TLM. It will get inserted at the start of an object for object types: Program, Subprogram and Subroutine.

```

0010 /* -----
0020 /* TLMCOM-START
0030 /* -----
0040 /* Updated by: XX-USER Dated: XX-DATE Time: XX-TIME using NEE
0050 /* -----
0060 /* TLMCOM -END
0070 /* -----

```

The XX-USER will be translated to *USER contents

The XX-DATE will be translated to DD/MM/YYYY from *DATX

The XX-TIME will be translated to HH:II:SS from *TIMX

The user can add additional code to their own specifications.

TLMAFTER

This is an example 'After Field' TLM for a field that would get inserted after a particular keyword or data item if specified in the Impact Search criteria or on the Modification Element Maintenance screen.

```
0010 * -----  
0020 * TLMAFTER - START  
0030 * -----  
0040 PERFORM ##VALIDATION  
0050 * -----  
0060 * TLMAFTER - END  
0070 * -----
```

TLMDYNAM

This is an example 'Dynamic operand replacement' TLM. It is used when a TLM has been used to modify a statement and retain the original statement operands.

For more information refer to the section [Dynamic Operand replacement in Text Logic Members](#).

```
0010 /* -----
0020 /*
0030 /* Sample TLM to show dynamic replacement of operands.
0040 /* This example shows how to use dynamic operand replacement to
0050 /* convert all MOVE statements to ASSIGNS
0060 /*
0070 /* Impact Criteria = MOVE with replacement TLM set of TLMDYNAM
0080 /*
0090 /* Up to 10 dynamic operands per statement may be specified.
0100 /* Conditional logic is specified via **NEE XX-OPERn and closed via
0110 /* **NEE BLOCK-END
0120 /*
0130 /* START OF TLMDYNAM
0140 /*
0150 /* -----
0160 ASSIGN XX-OPER2 = XX-OPER1
0170 **NEE XX-OPER3
0180 ASSIGN XX-OPER3 = XX-OPER1
0190 **NEE BLOCK-END
0200 **NEE XX-OPER4
0210 ASSIGN XX-OPER4 = XX-OPER1
0220 **NEE BLOCK-END
0230 **NEE XX-OPER5
0240 ASSIGN XX-OPER5 = XX-OPER1
0250 **NEE BLOCK-END
0260 **NEE XX-OPER6
0270 ASSIGN XX-OPER6 = XX-OPER1
0280 **NEE BLOCK-END
0290 /* -----
0300 /* END OF TLMDYNAM
0310 /* -----
```

Dynamic Operand replacement in Text Logic Members

If a TLM is used to modify a statement, it is possible to retain the use of the operands from the original statement within the TLM.

For example, if all MOVE statements are to be replaced by ASSIGN statements, the following search criteria could be specified:

Search Keyword = MOVE,
Replace TLM value = 'TLMDYNAM'
Replace Position set to REPLACE.

Note: For details on the sample TLM: TLMDYNAM refer to the section [Supplied Sample Text Logic Members](#).

Points to note using Dynamic Operand replacement TLMs:

1. Operands in the original statement are referenced in the TLM by using XX-OPERn. A maximum of 10 operands can be replaced this way, i.e., XX-OPER1 to XX-OPER10.
2. The replace TLM will only be activated with position set to REPLACE (search criteria specification). If position AFTER or BEFORE is used, then the dynamic operand replacement will not occur.
3. Conditional logic can be used within the TLM, by using the '**NEE' notation at the start of the statement line.

In the sample TLM above at line 0170, the statement '**NEE XX-OPER3' is an IF condition checking to see if XX-OPER3 exists in the original statement. If it does then the statement ASSIGN XX-OPER3 = XX-OPER1 will be included in the modified object. The '**NEE BLOCK-END' statement acts as an END-IF.

Example of Dynamic Operand replacement in a TLM

The following example illustrates a simple object which will have a modification applied changing the MOVE statement to ASSIGN using the example TLM illustrated above.

Sample object before modification:

```
0010 DEFINE DATA LOCAL
0020 01 #A          (A10)
0030 01 #B          (A10)
0040 01 #C          (A10)
0050 01 #D          (A10)
0060 01 #E          (A10)
0070 END-DEFINE
0080 /*
0090 MOVE #A TO #B #C #D #E
0100 /*
0110 END
```

The operands for dynamic replacement are:

```
#A for XX-OPER1
#B for XX-OPER2
#C for XX-OPER3
#D for XX-OPER4
#E for XX-OPER5
```

After modification the object code will look like this:

```
0010 DEFINE DATA LOCAL
0020 01 #A          (A10)
0030 01 #B          (A10)
0040 01 #C          (A10)
0050 01 #D          (A10)
0060 01 #E          (A10)
0070 END-DEFINE
0080 /*
0090 /* MOVE #A TO #B #C #D #E /* NEE OLD CODE
0100 /*
0110 /* -----
0120 /* START OF TLMDYNAM
0130 /* -----
0140 ASSIGN #B = #A
0150 ASSIGN #C = #A
0160 ASSIGN #D = #A
0170 ASSIGN #E = #A
0180 /* -----
0190 /* END OF TLMDYNAM
0200 /* -----
0210 END
```

Note: The leading comments from the supplied sample TLM: TLMDYNAM have been removed for the purpose of this example.

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Natural Engineer Application Analysis & Modification

Modification Preferences Window

All the specifications for the override TLMs are defined using the Modification Preferences screen. This is accessed by using the following menu navigation: Modification → Modification Preferences from the main Natural Engineer screen.

The following Figure 2-1 illustrates the Modification Preferences screen.

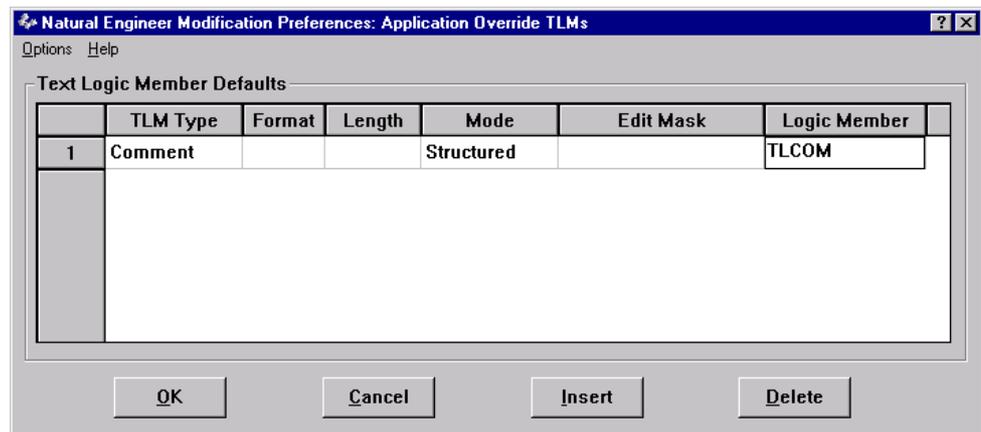


Figure 2-1 Modification Preferences screen

MENU ITEMS	OPTIONS	DESCRIPTION
Options	Site Wide / Application Override	<p>This option provides the facility to flip between the application override TLM details and the site wide TLM details. The option changes as follows:</p> <p>When application override details being displayed: ‘Site Wide TLMS for Reengineering’</p> <p>When site wide details being displayed: ‘Application Override TLMs for Reengineering’</p> <p><i>Note: The site wide TLM details cannot be modified using the Modification Preferences screen. For more information on the site wide TLMs refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.</i></p>
	Exit	Exits the Default Text Logic screen and returns back to the main Natural Engineer screen.
Help		Invokes the Default Text Logic Member help.

SCREEN ITEMS	DESCRIPTION
TLM Type	Specify what type of TLM is defined. Valid values are:
START	A TLM to be inserted at the Start of an Object. This is after the definition of the data items in the object.
DATA	A TLM that provides data items to be included in an object.
MISC	A TLM that is placed at the end of the object that can contain processing, for example including common routines.
COMMENT	To be inserted at the start of the object to explain another TLM inserted in the object. The following variables can be specified and will be replaced at remedy execution. <ul style="list-style-type: none"> • XX-DATE, which will be translated into DD/MM/YYYY • XX-TIME, which will be translated into HH:MM:SS • XX-USER, which will contain the user-id of the person who executed modification for the object.
CMPT COMM	The Component comment inserted at the start of the new component subprogram that has been created.
CMPT DATA	Component parameter data inserted as the last parameter passed in the subprogram. The TLM data must be specifically coded in this routine and must contain the following definition first. <p>01 #EXTRA-PDA</p> <p>If a component TLM is required to pass a data item #RESPONSE between the new subprogram and the object calling it, then the following is the structure for this TLM:</p> <p>01 #EXTRA-PDA 02 #RESPONSE (A1)</p>

SCREEN ITEMS	DESCRIPTION
SAG05 R1	<p>This is the default modification for empty FOR and REPEAT statement blocks. The TLM will insert the keyword IGNORE into the empty block. For Example:</p> <pre>1020 REPEAT 1030 IGNORE 1040 END-REPEAT</pre> <p><i>Note: Used in Nat 2.2 to Nat 3.1 conversion.</i></p>
SAG05 R2	<p>This TLM type can be used as an alternative to the default SAG05R1. This will comment out the empty statement block but then insert a line of code to set the applicable variable to the maximum value. For Example:</p> <p>FOR #A = 1 TO 10, will insert MOVE 10 TO #A.</p> <p>This will only be applied to a FOR loop block, a REPEAT loop block will only get commented out.</p> <p>Additionally, if this TLM type is selected in the preference screen, then prior to modification the update field button will need to be used on the Modification Element Maintenance screen to ensure the correct TLM is applied during modification.</p> <p><i>Note: Used in Nat 2.2 to Nat 3.1 conversion.</i></p>
Format	The format of the data item the TLM relates to. (Not used at present.)
Length	The length of the data item the TLM relates to. (Not used at present.)
Mode	Programming mode to which the TLM applies. Valid values are: <ul style="list-style-type: none"> Structured Structured mode Reporting Reporting mode
Edit Mask	The specific edit mask for the data item that the TLM relates to. (Not used at present.)
Logic Member	Name of the TLM to be used.

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Natural Engineer Application Analysis & Modification

BUTTON NAME	DESCRIPTION
OK	Saves the specified application override TLM details and returns back to the Natural Engineer main menu screen.
Cancel	Cancels any input on the screen and returns back to the Natural Engineer main menu screen.
Insert	Inserts a new blank line.
Delete	Deletes the selected line.

Modification Element Maintenance

The Modification Element Maintenance option provides the facility to review and modify interactively, the default modifications to be applied to objects from the last Impact execution for the currently selected version within an application. All impacted objects within an application are available for selection, once selected a list of the impacted data items within the object are listed.

The Modification Element Maintenance option allows each modification to be updated to change the modification types, categories and replacement values as desired. The Modification changes to be applied can be reviewed before they are implemented, using the Browser.

The Modification Element Maintenance option also provides the facility to review the Impact results in the Browser.

Modifications to single objects can be implemented from this option.

Modification Element Maintenance Window

The Modification Element Maintenance window is accessed by using the following menu navigation: Modification → Modification Element Maintenance from the main Natural Engineer screen.

The following Figure 2-2 illustrates the Modification Element Maintenance screen.

Cat Type	Line	Attr	Ext. Obj	Field Name
N	1	0020	A070	XX000G00 #G-MESSAGE Searching A
N	1	0020	A070	XX001L01 #L-MESSAGE Searching A
A	1	0110		#L-MESSAGE Searching A
A	1	0240		#L-MESSAGE Searching A
A	1	0260		#L-MESSAGE Searching A

Reason: Data item can be automatically changed

```

XX001L01 0020 1 #L-MESSAGE          A 70 /* Message at bottom of Screen
XX001P01 0110 RESET #L-MESSAGE
XX001P01 0240 MOVE "INVALID OPTION SELECTED" TO #L-MESSAGE
XX001P01 0260 MOVE "INVALID PF KEY PRESSED" TO #L-MESSAGE
  
```

Figure 2-2 Modification Element Maintenance screen

MENU ITEMS	OPTIONS	DESCRIPTION
Options	Change Start Position of Object List	Allows the Object List to be restarted from a particular object.
	Close	Closes the Modification Element Maintenance screen and returns back to the main Natural Engineer screen.
Object Types		<p>Allows you to select the Object Types to be listed. Available selections are:</p> <ul style="list-style-type: none"> ▪ All objects ▪ Programs ▪ Maps ▪ Data Defn. Modules ▪ Parameter Data Areas ▪ Global Data Areas ▪ Local Data Areas ▪ Copycodes ▪ Subprograms ▪ Subroutines ▪ Helproutines ▪ Dialogs ▪ Classes
Functions		Options to reset all the Modification Categories within objects to either ' Reject ' or ' Manual '. Available options are:
	Reject Single Object	This will apply a Modification Category of ' Reject ' to all Automatic and Manual Items in the selected object.
	Reject Multiple Object	This will apply a Modification Category of ' Reject ' to all Automatic and Manual Items for all objects.
	Manual Single Object	This will apply a Modification Category of ' Manual ' to all Automatic Items in the selected object.
	Manual Multiple Object	This will apply a Modification Category of ' Manual ' to all Automatic Items for all objects.
		<i>Note: For more information on the Reject or Manual Modification Categories refer to the section Modification Categories.</i>
Help		Invokes the Modification Element Maintenance help.

SCREEN ITEMS	DESCRIPTION
Object List	<p>The objects that have been impacted are listed in the left-hand list box. If you select an object, a list of data items are listed in the right-hand list box, which have been identified with possible modifications during the last Impact Analysis execution.</p> <p>Any objects which have had Modification applied will have an asterisk (*) after the object name.</p>
Data Items	<p>All the impacted items within an object are listed here. Each data item can be selected to show further details in the Category text, Type text and object details list boxes.</p> <p>Cat This is a 1-byte value, which denotes the Category of Modification to be applied for the data item. <i>Note: For more information on these categories refer to the section Modification Categories.</i></p> <p>Type This is a 2-byte value, which denotes the type of impact. <i>Note: For more information on type of impact refer to the section Impact Types in Chapter 1.</i></p> <p>Line Line number in the object where the Impact was identified.</p> <p>Attr The definition of the item, if appropriate.</p> <p>Ext. Obj The name of the object that contains the item identified as impacted e.g., external Local Data Area with a Data Item definition.</p> <p>Element Name The name of the data items impacted within the selected object.</p>
Category selection	<p>All the available modification categories are listed. Each one can be selected to change the default category provided by Impact execution. After 'Update Field' button is used, the new category code will appear in the Data Items list box under the Cat column.</p> <p><i>Note: For more information on these categories refer to the section Modification Categories.</i></p>
Type selection	<p>All the available impact types are listed. Each one can be selected to change the default type provided by Impact execution. After 'Update Field' button is used, the new type code will appear in the Data Items list box under the Type column.</p> <p><i>Note: For more information on type of impact refer to the section Impact Types in Chapter 1.</i></p>

SCREEN ITEMS	DESCRIPTION								
TLM	The name of the TLM to be used. This will display the name of the TLM that was specified with the Search Criteria, otherwise will be blank. A new TLM name can be input here.								
Pos	The position the TLM will be inserted relative to the Item. Available values are: <ul style="list-style-type: none"> ▪ After ▪ Before ▪ Replace. 								
TLM Data	Data for passing to the TLM. The modification process will move the value into the TLM Data field. TLM data field is XX-TLM.								
Replace Value	The value with which to replace the Item.								
Comment	A user-entered comment usually used to explain any change made to the defaults.								
Replace Defn	The definition to replace the original definition of the Item.								
Reason	Natural Engineer's reason for assigning the Category and Type.								
UserID	The User ID of the last change made to that Item.								
Last Update	The date and time of the last update to the Modification options.								
Object Details	This section will display all the references of the selected data item for the selected object. These details are organized in the following columns: <table border="0" style="margin-left: 20px;"> <tr> <td style="vertical-align: top;">Manual Source Code indicator</td> <td>If any Manual Source Code changes are available than this column is marked with an 'X' <i>Note: Manual Source Code changes will have a data item of 'SOURCE CODE' present.</i></td> </tr> <tr> <td style="vertical-align: top;">Object Name</td> <td>The name of the object in which the Impact is identified.</td> </tr> <tr> <td style="vertical-align: top;">Line Number</td> <td>The statement line number of the code that is identified as impacted.</td> </tr> <tr> <td style="vertical-align: top;">Statement</td> <td>The statement code which is impacted.</td> </tr> </table>	Manual Source Code indicator	If any Manual Source Code changes are available than this column is marked with an 'X' <i>Note: Manual Source Code changes will have a data item of 'SOURCE CODE' present.</i>	Object Name	The name of the object in which the Impact is identified.	Line Number	The statement line number of the code that is identified as impacted.	Statement	The statement code which is impacted.
Manual Source Code indicator	If any Manual Source Code changes are available than this column is marked with an 'X' <i>Note: Manual Source Code changes will have a data item of 'SOURCE CODE' present.</i>								
Object Name	The name of the object in which the Impact is identified.								
Line Number	The statement line number of the code that is identified as impacted.								
Statement	The statement code which is impacted.								

BUTTON NAME	DESCRIPTION
Both	This button provides additional refinement of the objects listed in the Objects List box. This button has three different states, with the button text changing accordingly: <ul style="list-style-type: none"> Both The default for the screen is to list all objects whether they have had Modification applied or not. Mod O Will only list objects that have had Modification applied. N Mod Will only list objects that have had no Modification applied.
Prev	Scrolls the object list to previous page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
More	Scrolls the object list to forward one page. This button will be available/unavailable depending on the value specified in the LISTBOXMAX parameter in the NATENG.INI file.
Additional Modify Parns	These parameters are available for maps so that the user can additionally specify entries for the following values: <ul style="list-style-type: none"> AL Display length for alphanumeric data item. NL Display length for a numeric data item. EM Edit mask for the data item.
View Impacted Code	Display the impacts within an object using the Browser. The whole object source code will be displayed with the impacted items highlighted using the colors set by the SPECIFIED, DERIVED and EXCLUDED parameters in the NATENG.INI file.
View Modify Code	Display the modified object code using the Browser. The whole object source code will be displayed with the modified code highlighted. This provides the facility to view the modifications before they are made real.
Update Field	Applies any changes made to the Modification settings, to the Item.
Execute Modification	Executes any automatic Modification changes, by copying the code into the defined Modification library and changing the code as required. <i>Note: This will only apply Modification changes to the currently selected object.</i>

BUTTON NAME	DESCRIPTION
Edit Object	<p>Invokes the Natural editor for the object that has been selected. Natural Engineer will be closed down. The Natural editor that is invoked will depend on the object type of the selected object, e.g., if a program object has been selected, then the program editor will be invoked.</p> <p>The library will be the Modification library specified in the application preferences.</p> <p><i>Note: This option is only available after Modification has been executed.</i></p>
Cancel	<p>Will close the Modification Element Maintenance screen and return back to the main Natural Engineer screen.</p>

Note: For more information on the NATENG.INI file parameters LISTBOXMAX, SPECIFIED, DERIVED and EXCLUDED refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Modification Categories

The following table shows all of the available modification categories:

Cat	Description
A	Automatic
	These are changes that can be made automatically by the Natural Engineer Modification process.
M	Manual
	These are changes that must be made manually by a user.
N	Not Applicable
	These are Items that are not relevant for change.
R	Reject
	These are Items that have been Rejected for change by a user.

Execute Modification for All Objects

The Execute Modification for All Objects option invokes the Modification process, which will apply the specified Modifications to the object source code for all the objects within an application, held on the Repository in one single operation.

This option is usually executed after review and confirmation that all Modification Categories, Types and other settings are as required, using the Modification Element Maintenance screen and Modification Reports.

Each object is modified as follows:

- The object is found in the application Natural library (i.e., the Natural library from which the Extract process extracted the objects).
- The object is then copied over to the Modification library (i.e., as specified in the Application Preferences).
- During the copy phase, the Modification process checks the Impact and Modification data held in the Repository for the object being modified and applies it to the modified version.

The Execute Modification for All Objects option is accessed using the following menu navigation: Modification → Execute Modification for All Objects. When this option is selected, a confirmation window is displayed.

The following Figure 2-3 illustrates the Execute Modification for All Objects confirmation window.

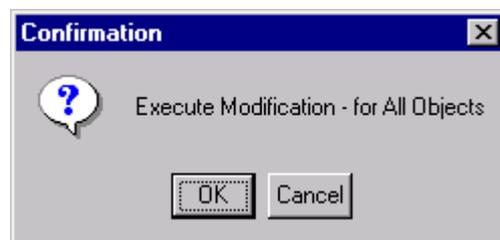


Figure 2-3 Execute Modification for All Object confirmation window

BUTTON NAME	DESCRIPTION
OK	Invokes Execute Modification for All Objects.
Cancel	Cancel Execute Modification for All Objects.

Warning: For any objects being modified, if the same object already exists in the Modification library, then it will be over written by the new version created during the Modification process.

Modification Inventory

The Modification Inventory consists of a set of Modification Reports, which provide various types of information concerning the Modification process. Reports are available at the summary, object and detailed data item levels.

The Modification Reports can be accessed using the following menu navigation: Modification → Modification Reports.

The following list illustrates the Modification Reports that are available:

- Application Modification Summary
- Object Modification Summary
- Category / Type Summary
- PREDICT Changes
- Data Item Inventory Modification
- Data Item Inventory for Automatic Modification
- Data Item Inventory for Manual Modification
- Impacted Objects Not directly Modified
- Construct Models Not directly Modified
- Database Data Requirements Modification
- View Modification Source Code

Note: For more information on the Modification Reports refer to Chapter 3 in the Natural Engineer Reporting manual.

In addition to the Modification Reports, all modification changes generate audit trail records of the before and after images of the changed source code. These audit trail records can be reviewed using the Change Management Tracking option from the Utilities menu.

Note: For more information on the Change Management Tracking option refer to Chapter 4 in the Natural Engineer Utilities for Windows manual.

COMBINATION SEARCH KEYWORDS

Chapter Overview

This chapter describes the combination search keywords that can be used when specifying Search Criteria for the Impact Analysis option.

These search keywords are not Natural statements in themselves, but are used to qualify a group of Impact search criteria, which may encompass several Natural statements in the process.

The topics in this chapter are:

1. [ADJUST](#)
2. [APPLICATION STANDARDS](#)
3. [CODE OPTIMIZATION](#)
4. [CODE RESTRUCTURING](#)
5. [INTERNATIONALIZATION](#)
6. [MULTI SEARCH](#)
7. [MVS NAT22 TO31](#)
8. [NATRPC](#)
9. [OBJECT BUILDER](#)
10. [PORTING](#)

ADJUST

The search keyword ADJUST can be used to change the name of an object within an application.

Impact will identify the object that has been specified within an application and using the consistency option with this search keyword, will result in all references to the object being identified within the other objects in the application.

Modification will copy and rename the specified object to the modification library and then change all impacted references within objects to use the new object name.

Example to illustrate the use of Adjust

This example will use the search keyword ADJUST to change the name of object XX021P01 to be SAG21P01. Consistency will be activated so that all references within the sample application HOSPITAL for object XX021P01 are found and changed to be SAG21P01.

Step 1 Create a new version of the impact search criteria and using a Keyword of ADJUST, a Keyword value of 'XX021P01', a Replace Value' of 'SAG21P01' and Consistency activated.

The following Figure 3-1 illustrates the specification of search keyword ADJUST in the Impact Criteria screen.

The screenshot shows the 'Natural Engineer Impact Criteria' dialog box. The 'Search Keyword' is set to 'ADJUST'. The 'Keyword Value [Object Name]' is 'XX021P01'. The 'Replace Value' is 'SAG21P01'. The 'Consistency' checkbox is checked. The 'Object Types' list includes DDMs, Global Data Areas, Local Data Areas, Parameter Data Area, Subroutines, Subprograms, Help routines, Maps, Programs, Dialogs, Copycode, and Classes. The 'Modification Parameters' section is empty. The 'Mark Definitions Only' checkbox is unchecked.

Figure 3-1 The specification of search keyword ADJUST

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Step 2 Execute Impact analysis.

Step 3 Review the Impact results using the Impact Element Maintenance screen. Impact Analysis will find impacts for three objects: XX002P01, XX021P01 and XX025P01.

The following Figure 3-2 illustrates the Impact Element Maintenance screen displaying the impacts for search keyword: ADJUST.

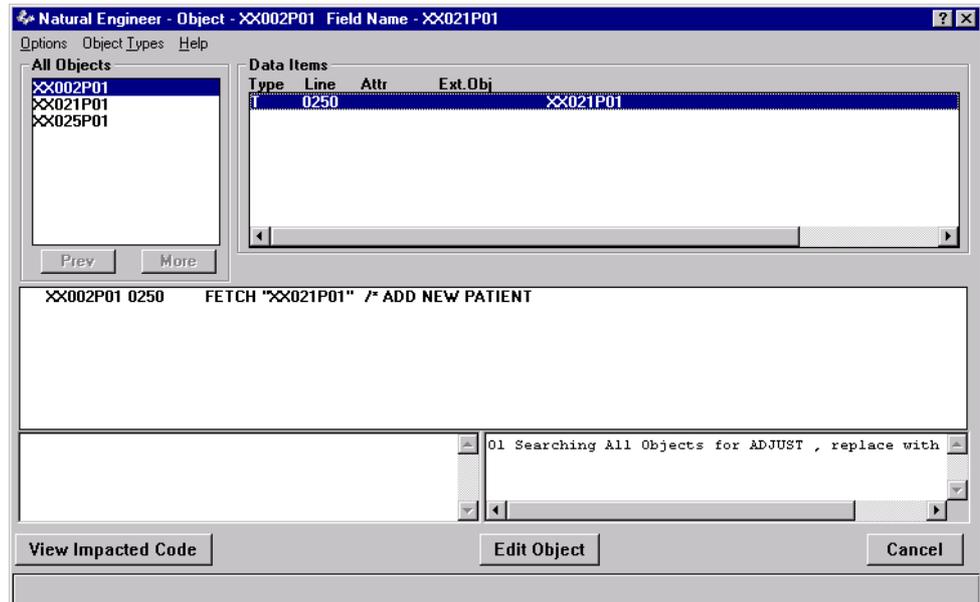


Figure 3-2 Impact Element Maintenance screen with impact results for ADJUST

Object XX021P01 has been impacted for the object rename. Objects XX002P01 and XX025P01 have been impacted because they make reference to object XX021P01.

Step 4 Review modification information by selecting objects using the Modification Element Maintenance screen. Select each object to view the modification strategy. All object changes with a category of ‘A’ will be automatically completed by Natural Engineer. All others must be reviewed.

The following Figure 3-3 illustrates the Modification Element Maintenance screen displaying the modification details for search keyword: ADJUST.

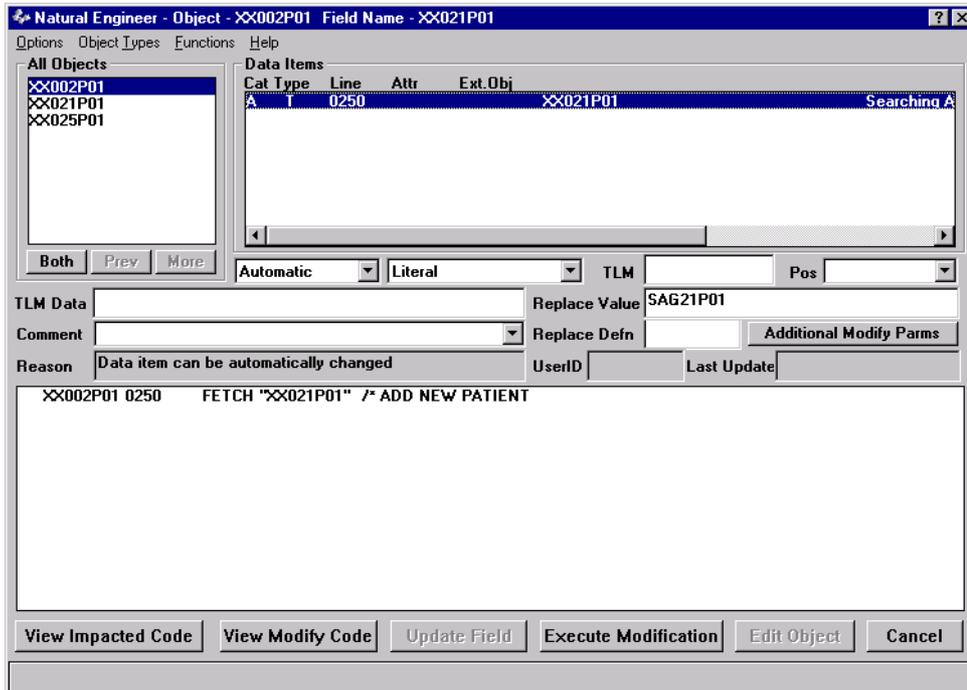


Figure 3-3 Modification Element Maintenance screen displaying modification details for ADJUST

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Natural Engineer Application Analysis & Modification

Step 5 Execute modification individually for each object from the Modification Element Maintenance screen. (Alternatively, use the Execute Modification for All Objects option from the Modification menu to apply all modifications in one single operation.)

This will copy each object to the Modification library HOSPITAX, and apply the changes that have been specified. The changes applied are:

1. Rename object XX021P01 to SAG21P01,
2. In object XX002P01, change statement at line number 0250:
From: FETCH "XX021P01"
To FETCH "SAG21P01".
3. In object XX025P01, change statement at line number 1080 :
From: FETCH RETURN "XX021P01" #M-PATIENT-ID (#W-LOOP)
To: FETCH RETURN "SAG21P01" #M-PATIENT-ID (#W-LOOP).

Step 6 Review the modifications applied by opening the modification library HOSPITAX in Natural.

The following Figure 3-4 illustrates the modified objects in the modification library HOSPITAX.

△	Name	Type	User ID	Source Date	Source Size	Catalog Date	Catalog Size	Mode
☰	SAG21P01	Program	GSLXXX	2001-09-18 17:01	6411			Structured
☰	XX002P01	Program	GSLXXX	2001-09-18 17:01	922			Structured
☰	XX025P01	Program	GSLXXX	2001-09-18 16:50	3337			Structured

Figure 3-4 Modified objects in modification library HOSPITAX

From the object list it can be seen that object XX021P01 has been renamed to SAG12P01.

The following Figure 3-5 illustrates the modified source code within object XX002P01.

```

0010 DEFINE DATA
0020 GLOBAL
0030 USING XX000G00
0040 LOCAL
0050 USING XX002L01
0060 END-DEFINE
0070 *
0080 SET KEY ALL
0090 *
0100 REPEAT
0110 *
0120 INPUT USING MAP "XX002MO1"
0130 RESET #M-MESSAGE
0140 *
0150 DECIDE ON FIRST VALUE OF *PF-KEY
0160 *
0170 VALUE "PF3", "PF15"
0180     FETCH "XX001P01"
0190 VALUE "PF12", "PF24"
0200     PERFORM XXEXIT
0210 VALUE "ENTR"
0220     DECIDE ON FIRST VALUE OF #M-OPTION
0230     VALUE "A"
0240         MOVE "A" TO #G-SELECTED-OPTION
0250 /*     FETCH "XX021P01" /* ADD NEW PATIENT /* NEE OLD CODE
0260     FETCH "SAG21P01" /* ADD NEW PATIENT /* NEE MODIFIED

```

Figure 3-5 Modified source code within object XX002P01

The following Figure 3-6 illustrates the modified source code within object XX025P01.

```

1030 DEFINE SUBROUTINE PROCESS-SELECTED
1040 *
1050 FOR #W-LOOP = 1 TO 15
1060     DECIDE FOR FIRST CONDITION
1070     WHEN #M-SELECTED(#W-LOOP) = " "
1080         ESCAPE TOP
1090     WHEN #M-SELECTED(#W-LOOP) NOT = " " AND
1100         #M-PATIENT-ID(#W-LOOP) = 0
1110         MOVE "YOU SELECTED A BLANK LINE - TRY AGAIN!" TO #G-MESSAGE
1120         ESCAPE ROUTINE
1130     WHEN #M-SELECTED(#W-LOOP) = "D" OR = "M"
1140         MOVE #M-SELECTED(#W-LOOP) TO #G-SELECTED-OPTION
1150     /*     FETCH RETURN "XX021P01" #M-PATIENT-ID(#W-LOOP) /* NEE OLD CODE
1160         FETCH RETURN "SAG21P01" #M-PATIENT-ID(#W-LOOP) /* NEE MODIFIED
1170         MOVE " " TO #M-SELECTED(#W-LOOP)
1180     WHEN NONE
1190         MOVE "INVALID CHARACTER FOUND IN SELECTION ARRAY" TO #G-MESSAGE
1200         ESCAPE ROUTINE
1210     END-DECIDE
1220 END-FOR
1230 PERFORM READ-DATA
1240 END-SUBROUTINE
1250 END

```

Figure 3-6 Modified source code within object XX025P01

Step 7 Copy the rest of the application HOSPITAL objects, taking care that the objects XX002P01 and XX025P01 do not get over written. Apply a CATAL to the HOSPITAX library and then execute the HOSPITAL system using the modified objects.

APPLICATION STANDARDS

The search keyword APPLICATION STANDARDS is used to measure how an application complies with acceptable Natural application standards.

This keyword makes use of a criteria sub-set, which is specified using either:

1. The Global Standards option, which is accessed by using the following menu navigation: Options→Administration→Global Standards from the main Natural Engineer screen.
2. The Application Standards option, which is accessed by using the following menu navigation: Analysis→Impact Data Preparation→Application Standards from the main Natural Engineer screen.

Each of these options allows you to specify the Natural application standards to be measured against either site wide (Global Standards) or application specific (Application Standards) standards.

Note: For more information on Global Standards refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.

Impact execution will review each object within an application against the specified standards, reporting any that do not comply.

Note: Automatic Modification is only available for the Labels and Data Manipulation options. For more information on Application Standards refer to the section [Impact Data Preparation](#).

CODE OPTIMIZATION

The search keyword CODE OPTIMIZATION can be used to locate certain Natural statements that may cause performance considerations within Natural Applications.

This search keyword uses a sub-set of criteria, which are specified using the options provided by the Keyword Value Options button from the Impact Search Criteria screen.

Note: For more information on the Keyword Value Options button refer to the section [Impact Criteria window](#).

Once impacted, it will then be possible to modify the code to correct the inefficiencies found, using the modification function.

Specifying Code Optimization Preferences

To use code optimization criteria, you must first select the search keyword CODE OPTIMIZATION from the keyword list on the Impact Search Criteria screen. This will enable the Keyword Value Options button to the right of the Keyword Value input box, which will contain the text '**Code Opt Options**'.

The following Figure 3-7 illustrates the specification of search keyword CODE OPTIMIZATION in the Impact Criteria screen.

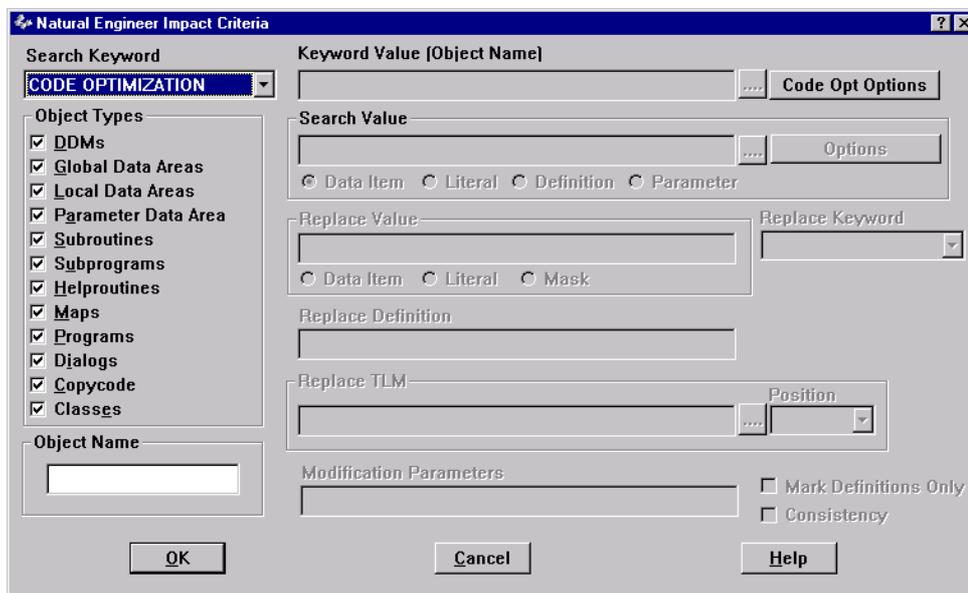


Figure 3-7 The specification of search keyword CODE OPTIMIZATION

Using the 'Code Opt Options' button will invoke the Code Optimization Preferences screen where all the Code Optimization functions can be selected / de-selected.

The following Figure 3-8 illustrates the Code Optimization Preferences screen.

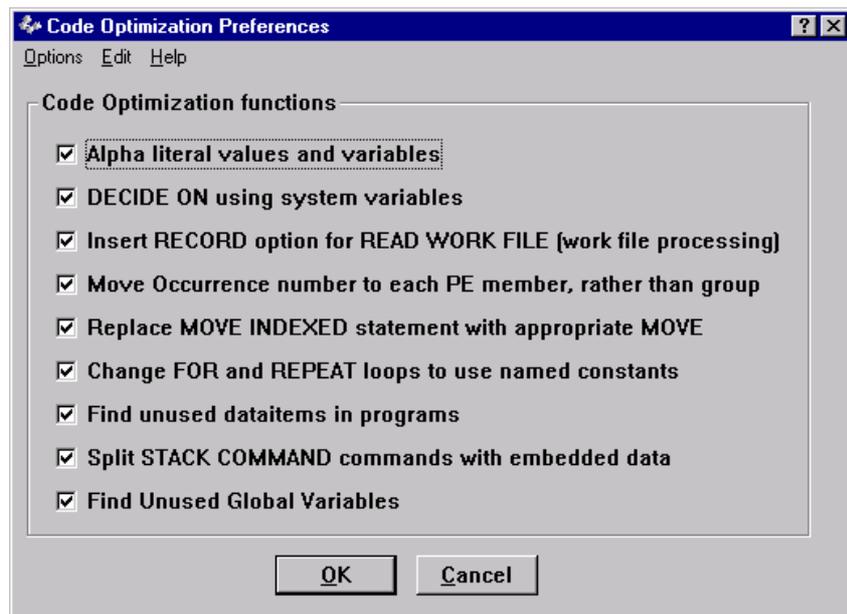


Figure 3-8 Code Optimization Preferences screen

MENU ITEMS	OPTIONS	DESCRIPTION
Options	Close	Closes the Code Optimization Preferences screen and returns back to the Impact Criteria screen.
Edit	Select All	Selects all the Code Optimization options.
	Deselect All	Deselects all the Code Optimization options.
Help		Invokes the Code Optimization Preferences help.

SCREEN ITEMS	DESCRIPTION
Code Optimization functions	All the available Code Optimization options are listed for selection. <i>Note: For more information on each of the options refer to the section Code Optimization Options.</i>

BUTTON NAME	DESCRIPTION
OK	Accepts the selections made and return back to the Impact Criteria screen.
Cancel	Cancels any selections made and returns back to the Impact Criteria screen.

Code Optimization Options

There are nine Code Optimization options supported. The default setting is for all nine options to be selected. These can be selected or de-selected as required.

The available Code Optimization options are:

1) Alpha literal values and variables.

Impact will look for any literal string being moved to alpha variables that are defined with a length greater than the length of the literal string.

Modification will pad the literal string value with spaces to match the length of the alpha variable.

2) DECIDE ON using system variables.

Impact will look for any DECIDE ON statements that reference system variables, for example *PF-KEY, *DATE.

Modification will generate a temporary variable and move the system variable to this temporary variable. The DECIDE ON statement will then be changed to reference the temporary variable rather than the system variable.

3) Insert RECORD option for READ WORK FILE (work file processing).

Impact will look for any READ WORK FILE statements that only use one user-defined variable.

Modification will add the RECORD clause to these READ WORK FILE statements.

4) Move occurrence number to each PE member, rather than group.

Impact will look for any logical view data definitions where the occurrences for a PE group are defined at the group level rather than for each child level within that group.

Modification will change the PE group definition so that the number of occurrences is at each child level within the group and remove the number of occurrences from the PE group variable.

5) Replace MOVE INDEXED statement with appropriate MOVE.

Impact will look for any MOVE INDEXED statements.

Modification will perform one of the following:

- Standard MOVE INDEXED statements will be replaced with the correct MOVE statement.
- MOVE INDEXED statements utilizing contiguous storage will produce a message "Object 'object-name' contains a contiguous MOVE INDEXED statement. This is marked for manual change." The MOVE INDEXED statement will be marked for manual change and have a comment of "REASON: CONTIGUOUS MOVE INDEXED" appended.

Example of contiguous MOVE INDEXED statement:

```
0010 RESET #FIELD-1 (A10) #FIELD-2 (A10) #DISPLAY (A10)
0020 MOVE 'CORRECT' TO #FIELD-1
0030 MOVE 'WRONG' TO #FIELD-2
0040 MOVE INDEXED #FIELD-1<2> TO #DISPLAY
0050 WRITE #DISPLAY
```

- MOVE INDEXED statements for DDM fields will produce a message "Object 'object-name' contains a view with a MOVE INDEXED statement. This is marked for manual change." The MOVE INDEXED statement will be marked for manual change and have a comment of "REASON: FIELD IS FROM A VIEW" appended.

Example of MOVE INDEXED statement for DDM fields:

```
0010 RESET #DISPLAY-ADDRESS (A20)
0020 READ EMPLOYEES BY NAME
0030 OBTAIN ADDRESS-LINE(1:4)
0040 MOVE INDEXED ADDRESS-LINE<1> TO #DISPLAY-ADDRESS
0050 LOOP
```

6) Change FOR and REPEAT loops to use named constants.

Impact will look for any FOR and REPEAT statements that make use of numeric literal values.

Modification will change the impacted FOR and REPEAT statements to use variables defined with CONSTANT values.

7) Find unused dataitems in programs.

Impact will look for any unused dataitems. These can be user-defined variables or logical view variables.

Modification will comment out any unused dataitems.

Note: LDA and PDA objects with unused dataitems will not be modified.

8) Split STACK COMMAND commands with embedded data.

Impact will look for any STACK COMMAND statements and check if both data and commands have been stacked with the same statement.

Modification will split the STACK COMMAND statements impacted into STACK DATA and STACK COMMAND statements.

9) Find unused Global Variables.

Impact will look for any unused Global variables defined in a GDA, across a whole application. Impacts are only marked within the GDA objects and not individual objects.

No Modification is available for this option.

CODE RESTRUCTURING

The search keyword CODE RESTRUCTURING can be used to locate any IF/ELSE Natural statement blocks. These can then be reviewed and converted to DECIDE statements to improve the readability of the statement code within an object.

This search keyword will use a keyword value of IF.

Note: No automatic modification is available for this search keyword.

INTERNATIONALIZATION

The search keyword INTERNATIONALIZATION can be used to prepare applications for Internationalization, which will allow applications to cater for multi-lingual support, for example message texts.

This search keyword will use a keyword value of INPUT and an additional search keyword of DEFINITION with a search value of A1.

Impact will use these criteria to locate all INPUT statements with references to any data item with a format and length of alpha one.

Note: No automatic modification is available for this search keyword.

Natural Engineer comes supplied with a search criteria file CODEINT.IRE, which contains the required search criteria for the search keyword INTERNATIONALIZATION. This file can be located in the X:\PROGRAM FILES\SOFTWARE AG\NATURAL ENGINEER\4.4.2\DATA folder, where X: is the drive on which Natural Engineer has been installed.

This file can be accessed using the File→Open option from the Impact Search Criteria Summary screen.

Note: For more information on opening the search criteria file refer to the section [Impact Search Criteria Summary window](#).

MULTI SEARCH

The search keyword MULTI SEARCH allows for more advanced search criteria to be specified, including, conditions that are to be included in the analysis, or excluded from the analysis.

The search keyword MULTI SEARCH allows up to 500 search conditions to be combined. These may be DATAITEM searches, DBFILE searches, LITERAL searches and/or attribute searches.

The MULTI SEARCH criteria can be specified using the Keyword Value Options button, which will contain the text '**Multi Options**', from the Impact Criteria screen.

Note: For more information on the Keyword Value Options button refer to the section [Impact Criteria window](#).

The MULTI SEARCH criteria can be saved to a PC text file, allowing them to be re-used across applications. These files will have a file extension of '.ISC'. By default these files will be saved to the data folder where Natural Engineer is installed. For example: X:\PROGRAM FILES\SOFTWARE AG\NATURAL ENGINEER\4.4.2\DATA, where X: is the drive on which Natural Engineer was installed.

Note: Natural Engineer comes supplied with a default MULTI SEARCH criteria file ###DEF01.ISC. For more information refer to Chapter 3 in the Natural Engineer Administration Guide for Windows manual.

Multi Search Criteria Window

The Multi Search Criteria window is accessed by using the Keyword Value Options button, which will contain the text 'Multi Options', from the Impact Criteria screen.

The following Figure 3-9 illustrates the Multi Search Criteria screen.

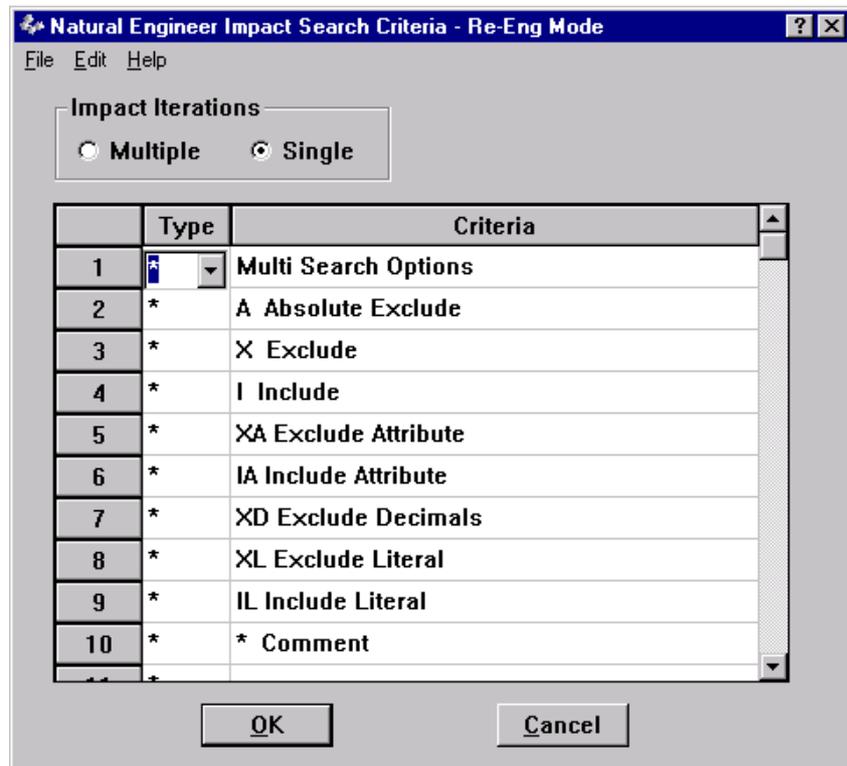


Figure 3-9 Multi Search Criteria screen

MENU ITEMS	OPTIONS	DESCRIPTION
File	Open	Open and read in an existing Multi Search criteria file. (Files with file extension '.ISC'.)
	Default	Open and read in the default Multi Search criteria file '###DEFnn.ISC', where nn refers to the language code specified in the LANG parameter in the NATENG.INI file. <i>Note: For more information on the NATENG.INI file parameter LANG refer to Chapter 1 in the Natural Engineer Administration Guide for Windows manual.</i>
	Save As	Save the current Multi Search Criteria as a PC text file with file extension '.ISC'.
	Sort	Will perform a sort of all the Multi Search criteria into the following criteria type order: <ul style="list-style-type: none"> ▪ Absolute Excludes (A) ▪ Exclude Field (X) ▪ Include Field (I) ▪ Exclude Format (XA) ▪ Include Format (IA) ▪ Exclude Decimals (XD) ▪ Exclude Literal (XL) ▪ Include Literal (IL) <i>Note: Comments (*) maintain position for the criteria type that they precede. For example: * Exclude MESSAGE fields X ?MESSAGE? Would always be kept together as a pair. Any comments found in line 1 will always be retained at line 1 and can be used as a description line for the criteria set.</i>
	Exit	Exits the Multi Search criteria screen and returns back to the Impact Criteria screen.
Edit	Insert Row	Add a new row into the object list box.
	Delete Row	Delete an existing row from the object list box.
Help		Invokes the Multi Search help.

SCREEN ITEMS	DESCRIPTION
Impact Iterations	<p>The processing level to be applied to the Multi Search criteria during Impact Analysis execution. Available selections are:</p> <p>Multiple Impact will match the specified search criteria and any derivatives will be identified.</p> <p><i>Note: The tracking information can be further controlled by the NATENG.INI file parameter TRACKING. For more information refer to section Forward/Backward Tracking.</i></p> <p>Single Impact will only match for the specified search criteria. No derivative tracking will be performed.</p>
Criteria Number	Sequential number for each criteria starting from 1.
Criteria Type	<p>The type of Multi Search criteria.</p> <p><i>Note: For more information refer to section Multi Search Criteria Types.</i></p>
Criteria Value	<p>The criteria that are to be applied. These can be full or partial field names. They can also be full or partial values of literal strings and numerics. If partial names or values are used, they must be entered using wild card ‘?’</p> <p><i>Note: For more information refer to section Criteria Values.</i></p>

BUTTON NAME	DESCRIPTION
OK	Saves the Multi Search Criteria and return back to the Impact Criteria screen.
Cancel	Cancels any inputs made and returns back to the Impact Criteria screen.

Multi Search Criteria Types

There are nine criteria types that can be used:

1. '*' – Comment Line

- These criteria types allow for comments to be placed anywhere within the criteria list for any documentation notes or as separators between the criteria.
- They are ignored by the Impact process.

2. 'A' – Absolute Exclude Field

- These criteria types will result in the Impact process excluding any fields that are an exact match for the value specified. These fields will be permanently excluded from the Impact process.
- These criteria types must be at the top of the criteria list, before any other criteria types.

3. 'X' – Exclude Field

- These criteria types will result in the Impact process excluding parts of a field name, while the remainder of the field name is still searched for inclusion.
- These criteria types make use of the 'Byte-Lockout' process.
Note: For more information refer to the section [Byte-Lockout Process](#).
- These criteria types must be located before the 'I' – Include Field criteria types in order to benefit from the 'Byte-Lockout' process.

4. 'I' – Include Field

- These criteria types will result in the Impact process including any fields that match the value specified.
- If a criteria value is specified without the use of wild card '?', then it is an absolute include. For example: 'I DATE'.
- These criteria types must be located after the 'X' – Exclude Field criteria types.

5. 'XA' – Exclude Format

- These criteria types will result in the Impact process excluding any field that matches the format value. For example: 'XA A001' would exclude all fields with a format of A001.
- These criteria types can have format ranges specified. For example:
'XA N1-N20' will exclude any fields that have a format of N and a length between 1 and 20. This would include any fields that have decimal places, e.g., N6.2.
'XA P5.2-P9.2' will exclude any fields with format N and length between 5.2 and 9.2.
Note: If a comma is used to reference a decimal place, then Natural Engineer will convert them to decimal points for Impact to use (i.e., 5,3 becomes 5.3). For Modification they will be converted back to a comma.
'XA N-N999' will exclude any numeric type field.
- These criteria types must be located before the 'IA' – Include Format criteria types.

6. 'IA' – Include Format

- These criteria types will result in the Impact process including any field that matches the format value. For example: 'XA A001' would include all fields with a format of A001.
- These criteria types can have format ranges specified. For example:
'IA N1-N20' will include any fields that have a format of N and a length between 1 and 20. This would include any fields that have decimal places, e.g., N6.2.
'IA P5.2-P9.2' will include any fields with format N and length between 5.2 and 9.2.
Note: If a comma is used to reference a decimal place, then Natural Engineer will convert them to decimal points for Impact to use (i.e., 5,3 becomes 5.3). For Modification they will be converted back to a comma.
'IA N-N999' will include any numeric type field.
- These criteria types must be located after the 'XA' – Exclude Format criteria types.

7. 'XL' – Exclude Literal

- These criteria types will result in the Impact process excluding any literal string that matches the criteria value. For example: 'XL ABCDEF' would exclude all literal strings that match the value 'ABCDEF'.

Note: If a partial value is used, then the literal string, may still be included by any subsequent 'IL' - Include Literal criteria. For example:

using the literal string 'ABCDEF'

Criteria 'XL ?ABC?' and 'IL ?DEF?' would result in the literal string being included in the Impact Analysis.

Criteria 'XL ABCDEF' and 'IL ?DEF?' would result in the literal string being excluded in the Impact Analysis.

- These criteria types must be located before the 'IL' – Include Literal criteria types.

8. 'IL' – Include Literal

- These criteria types will result in the Impact process including any literal string that matches the criteria value. For example: 'IL ABCDEF' would include all literal strings that match the value 'ABCDEF'.

- These criteria types must be located after the 'XL' – Exclude Literal criteria types.

9. 'XD' – Exclude Decimal

These criteria types will result in the Impact process excluding any fields that have been defined to hold decimals. For example: N3.1, N1.4 etc.

Criteria Values

Criteria Values specify the search value for the criteria type being used. These can be entered using full or partial values.

Full Value Criteria

If full values are used then the Impact process will only match if the exact value specified matches the item. These types of criteria value are known as absolute values, i.e., an exact match must be made. For example:

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0010 01 #ALPHA (A10)
0020 01 #ALPHA-BET (A26)
0030 MOVE 'ABCDEF' TO #ALPHA-BET
0040 MOVE 'ABC' TO #ALPHA

Criteria 'I #ALPHA' will impact line 0010 AND 0040 only.

Criteria 'IL ABC' will impact line 0040 only.

Partial Value Criteria

Partial Value criteria can be specified by using the wildcard '?' as part of the value specification. These types of criteria value allow a range to be specified for field names or literal strings.

There are three positions the wildcard can be placed:

1. At the beginning of the value.

Impact will look for a match for any field or literal that ends with the specified value. The format is ?value.

2. At the end of the value.

Impact will look for a match for any field or literal that starts with the specified value. The format is value?.

3. At both the beginning and the end of the value.

Impact will look for a match for any field or literal that contains the specified value. The format is ?value?.

Examples:

0010 01 #INDEX-ONE (I02)
0020 01 #ONE-INDEX (I02)

Criteria 'I ?ONE' will impact line 0010 only.

Criteria 'I ONE?' will impact line 0020 only.

Criteria 'I ?ONE?' will impact line 0010 and 0020.

Additional option

For the criteria types Include (I) and Exclude (X), it is also possible to include or exclude by name and length by adding a format and length to the criteria value. This can be specified as an absolute format or a range.

For example:

'**X ?FRED? (A10)**' will exclude any field with a name that includes FRED and with a format and length of A10.

'**I #TOTAL (N2-N9)**' will include any field with a name of #TOTAL and a format and length that falls between the range N2 to N9.

Byte Lockout Process

This is a unique technique to handle parts of field names that may be included or excluded in the impact reports, depending on the defined search criteria.

For example, if you define UPDATE to be excluded but DATE to be included in the search, the UPDATE part of the field UPDATE-DATE will be excluded, but the DATE part will be included for further processing. Conversely, the field UPDATE will be excluded as defined, and not be included merely on the basis of the inclusion of DATE. This process works for literal values as well as fields.

MVSNAT22TO31

The search keyword MVSNAT22TO31 can be used to identify and modify incompatibilities between the syntax for Natural 2.2 and 3.1.

Note: The incompatibilities that exist between Natural 2.2.8 and Natural 3.1 are the same as those between Natural 2.2.8 and Natural 2.3.

This search keyword uses a sub-set of criteria, which are specified using the options provided by the Keyword Value Options button from the Impact Search Criteria screen.

Note: For more information on the Keyword Value Options button refer to the section [Impact Criteria window](#).

MVSNAT22TO31 Preferences Window

The MVSNAT22TO31 Preferences window is accessed by using the Keyword Value Options button, which will contain the text 'MVSNAT2231 Opts', from the Impact Criteria screen.

The following Figure 3-10 illustrates the MVSNAT22TO31 Preferences screen.

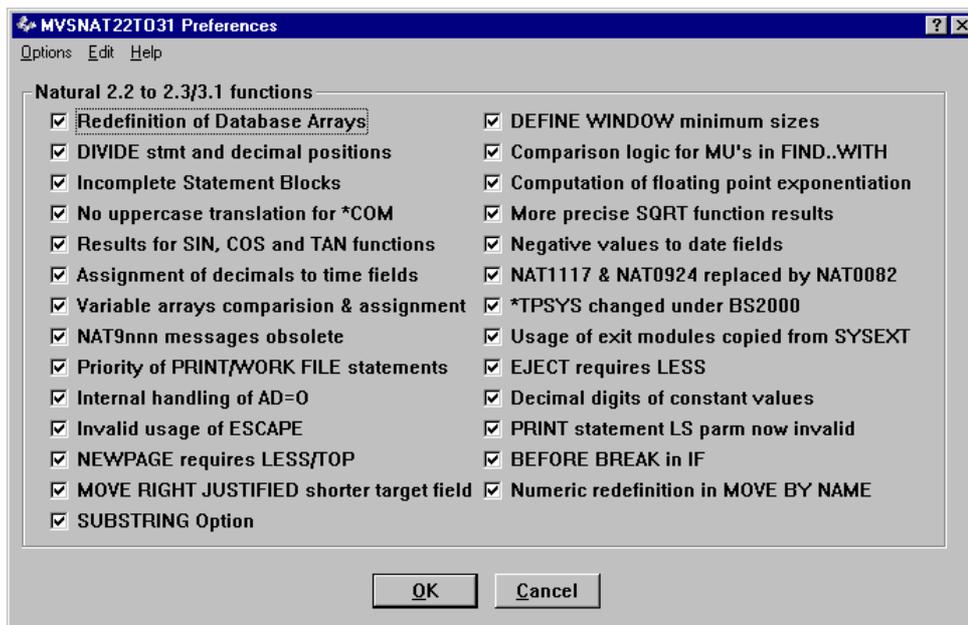


Figure 3-10 MVSNAT22TO31 Preferences screen

MENU ITEMS	OPTIONS	DESCRIPTION
Options	Close	Will close the MVSNAT22TO31 Preferences screen and return back to the Impact Criteria screen.
Edit	Select All	Selects all the MVSNAT22TO31 sub-criteria.
	Deselect All	Deselects all the MVSNAT22TO31 sub-criteria.
Help		Invokes the MVSNAT22TO31 help.

SCREEN ITEMS	DESCRIPTION
MVSNAT22TO31 sub-criteria	<p>Each available MVSNAT22TO31 sub-criteria is listed and if selected will be used during Impact execution. Each sub-criteria can be selected or deselected individually. Available sub-criteria and their respective modification types are:</p> <ul style="list-style-type: none"> ▪ Redefinition of Database Arrays (SAG01) ▪ DEFINE WINDOW minimum sizes (SAG02) ▪ DIVIDE stmt and decimal positions (SAG03/SAG3) ▪ Comparison logic for MU's in FIND..WITH (SAG04) ▪ Incomplete Statement Blocks (SAG05 R1 /SAG05 R2) ▪ No uppercase translation for *COM (SAG07) ▪ Computation for floating point exponentiation (SAG08/SAG13) ▪ Results for SIN, COS and TAN functions (SAG09) ▪ More precise SQRT function results (SAG10) ▪ Assignment of decimals to time fields (SAG11) ▪ Negative values to date fields (SAG12) ▪ Variable arrays comparison & assignment (SAG14) ▪ NAT1117 & NAT0924 replaced by NAT0082 (SAG15) ▪ NAT9nnn messages obsolete (SAG16) ▪ *TPSYS changed under BS2000 (SAG17) ▪ Priority of PRINT/WORK FILE statements (SAG18) ▪ Usage of exit modules copied from SYSEXT (SAG19) ▪ Internal handling of AD=O (GSL01) ▪ EJECT requires LESS (GSL02) ▪ Invalid usage of ESCAPE (GSL03) ▪ Decimal digits of constant values (GSL04) ▪ NEWPAGE requires LESS/TOP (GSL05) ▪ PRINT statement LS parm now invalid (GSL06) ▪ MOVE RIGHT JUSTIFIED shorter target field (GSL07) ▪ BEFORE BREAK in IF (GSL08) ▪ SUBSTRING Option (GSL09) ▪ Numeric redefinition in MOVE BY NAME (GSL10)

Note: For more information on each of these options refer to the section [Natural 2.2 / 3.1 Incompatibilities](#).

Combination Search Keywords

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BUTTON NAME	DESCRIPTION
OK	Saves the MVSNAT22TO31 sub-criteria and return back to the Impact Criteria screen.
Cancel	Cancel any selections made and returns back to the Impact Criteria screen.

Natural 2.2 / 3.1 Incompatibilities

Natural Engineer identifies the following incompatibilities between Natural 2.2 and Natural 3.1.

Some of the incompatibilities can be modified using the Modification process, others will only have the Impact process available and manual modifications may need to be applied to each of these.

Note: The NEE Modification Type relates to the modification types and codes that are available from the Modification Element Maintenance screen. For more information refer to the section [Modification Element Maintenance](#).

1. Redefinition of Database Arrays

Description	It is no longer possible to specify a variable index range in the redefinition of a periodic-group or multiple value fields.
NEE Impact	NEE will identify any variable index range specified where the field is a redefinition of a periodic-group or multiple value field.
NEE Modification Type	3a SAG01
NEE Modification	Automatic. NEE will replace the variable index range with a 1 by default. A different replacement value may be specified by setting the appropriate value required in the 'Replace Value' section on the Modification Element Maintenance screen.

2. DEFINE WINDOW Minimum Window Size

Description	The minimum size of a window definition in the SIZE clause of the DEFINE WINDOW statement is 2 lines by 10 columns without a frame and 4 lines by 13 columns with a frame. In Natural 2.2 a size smaller than the minimum may be specified. In Natural 3.1 a NAT1167 compilation error will occur if the lines are wrong, NAT1166 if columns.
NEE Impact	Natural Engineer will identify DEFINE WINDOW statements where the line or column values are less than the minimum allowed.
NEE Modification Type	3b SAG02
NEE Modification	Automatic. Natural Engineer will replace the invalid line or column value with the minimum defined values.

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3. DIVIDE statement with GIVING and REMAINDER Clauses

Description	In Natural 3.1, if a DIVIDE statement has both GIVING and REMAINDER options then if the dividend (Operand 2) has more or fewer decimal positions than the result field, then different results will be shown for the REMAINDER field.
NEE Impact	Natural Engineer will identify all DIVIDE statements containing GIVING and REMAINDER where the number of decimals of the dividend is greater or fewer than that of the result. It will also identify the data definition of the relevant result field.
NEE Modification Type	3c SAG03 3h SAG3
NEE Modification	Automatic. The DIVIDE statement is identified by the SAG03 type. There is however no modification to be applied to the actual DIVIDE statement so the modification category is set to Not Applicable. The data definition for the result field is identified by the SAG3 type. This is automatically changed so that the decimal places of the data definition for the result field is the same as that of the dividend.

4. Comparison Logic for MU's in FIND..WITH

<p>Description</p>	<p>The comparison logic for multiple value fields in the WITH clause of the FIND statement has been changed to be in line with other comparison logic in other statements, for example IF.</p> <p>1. FIND XYZ-VIEW WITH MU = 'A'</p> <p>With Natural 2.2 and 3.1, this statement returns records in which at least one occurrence of MU has the value 'A'.</p> <p>2. FIND XYZ-VIEW WITH MU NOT EQUAL 'A'</p> <p>With Natural 2.2, this statement returns records in which no occurrence of MU has the value 'A' (same as 4.).</p> <p>With Natural 3.1, this statement returns records in which at least one occurrence of MU does not have the value 'A'.</p> <p>3. FIND XYZ-VIEW WITH NOT MU NOT EQUAL 'A'</p> <p>With Natural 2.2, this statement returns records in which at least one occurrence of MU has the value 'A' (same as 1).</p> <p>With Natural 3.1, this statement returns records in which every occurrence of MU has the value 'A'.</p> <p>4. FIND XYZ-VIEW WITH NOT MU = 'A'</p> <p>With Natural 2.2 and 3.1, this statement returns records in which no occurrence of MU has the value 'A'.</p> <p>This means that if you newly compile under Natural 3.1 existing Natural 2.2 programs containing FIND statements of the type 2 and 3., they will return different results.</p>
<p>NEE Impact</p>	<p>Natural Engineer will identify all FIND statements using an MU field in the WITH clause like:</p> <p>1) MU NOT EQUAL Value</p> <p>2) NOT MU NOT EQUAL Value</p>
<p>NEE Modification Type</p>	<p>3d SAG04</p>
<p>NEE Modification</p>	<p>Automatic.</p> <p>The modification will be applied as follows:</p> <p>1) MU NOT EQUAL Value to NOT MU = value</p> <p>2) NOT MU NOT EQUAL Value to MU = Value</p>

5. Empty Statement Blocks for FOR and REPEAT

Description	<p>In Natural 2.2 an empty statement block e.g. FOR or REPEAT may not lead to compilation errors.</p> <p>In Natural 3.1, this is removed.</p>
NEE Impact	
NEE Modification Type	<p>3e SAG05R1</p> <p>3@ SAG05R2</p>
NEE Modification	<p>Automatic.</p> <p>The default modification for this problem is SAG05R1. This will insert into the empty statement block an IGNORE statement based on the TLM N31R05T1.</p> <p>An alternative modification is SAG05R2. This will comment out the empty statement block but then insert a line of code to set the applicable variable to the maximum value. For Example:</p> <p>FOR #A = 1 TO 10, will insert MOVE 10 TO #A.</p> <p>This is based on the TLM N31R05T2. The insertion of this TLM will only apply to FOR loops. REPEAT loops will only be commented out and NO TLM will be inserted.</p> <p>Before applying this modification, the TLM's N31R05T1 and N31R05T2 need to be copied from the SYSNEE library to SYSTEM or the modification library of the Natural Engineer Application. In addition Modification Preferences will need to be defined for the specific Modification Type to assign the TLM's to the type.</p>

6. No Upper-case translation for *COM

Description	In Natural 2.2 *COM may be specified with an AD=T attribute. This is ignored at runtime but not rejected at compile. In Natural 3.1 this will lead to a compile error NAT0335.
NEE Impact	Natural Engineer will identify all occurrences of *COM with an AD=T attribute.
NEE Modification Type	3g SAG07
NEE Modification	Automatic. The AD=T attribute is removed from the *COM data item.

7. Computation of Floating-Point Exponentiation Corrected

Description	With Natural 2.2, if, in an exponentiation, both the base and the exponent are of floating-point format, the length of the exponent is used for the computation of the result. With Natural 3.1, if, in an exponentiation, both the base and the exponent are of floating-point format, the length of the base is used for the computation of the result. With Natural 2.2, if, in an exponentiation, the exponent is of floating-point format and the base is not, the base is internally converted to format/length F4 or F8, depending on the length of the base. With Natural 3.1, if, in an exponentiation, the exponent is of floating-point format and the base is not, the base is internally always converted to format/length F8 so as to get the greatest possible precision. Both the above corrections may in some cases lead to different results; however, these results will be of a greater precision.
NEE Impact	Natural Engineer will identify all relevant occurrences.
NEE Modification Type	3n SAG13/SAG08
NEE Modification	Manual.

8. Results for SIN, COS and TAN functions

Description	<p>With Natural 2.2, when the mathematical functions SIN, COS and TAN (sine, cosine and tangent) are applied to very large numbers (equal to or greater than 10^{++17}), they may in some cases return incorrect results.</p> <p>With Natural 3.1, for numbers equal to or greater than 10^{++17} the sine will be 0, the cosine will be 1 and the tangent will be 0.</p> <p>This may in some cases lead to different results.</p>
NEE Impact	Natural Engineer will identify all SIN, COS and TAN references.
NEE Modification Type	3i SAG09
NEE Modification	Manual.

9. More precise SQRT function results

Description	<p>With Natural 3.1, the computation of the mathematical function SQRT (square root) has been improved for floating-point operands.</p> <p>This may in some cases lead to different results. However, these results will be of a greater precision.</p>
NEE Impact	Natural Engineer will identify all relevant SQRT references and all data items used in these statements.
NEE Modification Type	3j SAG10
NEE Modification	Manual.

10. Assignments of Numbers with Decimal Digits to Time Fields

Description	<p>With Natural 2.2, if numbers (format N or P) decimal positions are assigned/moved to a time field (format T), the entire number is assigned/moved as an integer; that is, the decimal point is ignored.</p> <p>With Natural 3.1, this error has been corrected: The positions after the decimal point will be truncated, or rounded (if the ROUNDED option is used in the corresponding COMPUTE or MOVE statement). This may lead to different results, which will, however, be correct.</p>
NEE Impact	Natural Engineer will identify all COMPUTE, MOVE statements moving a P, N variable or a value with decimal digits to a time field.
NEE Modification Type	3k SAG11
NEE Modification	Manual.

11. Negative Values to Date Fields

Description	<p>It is not allowed to assign a negative value to a date field (format D) or a time field (format T).</p> <p>With Natural 2.2, however, such invalid assignment at runtime may in some cases not be intercepted.</p> <p>With Natural 3.1, this has been corrected: The assignment of a negative value to a date or time field will always lead to an error (NAT1319).</p>
NEE Impact	All negative assignments to Date or Time fields are identified.
NEE Modification Type	3m SAG12
NEE Modification	Manual.

12. More precise Results for Floating Point Conversions

Description	The format conversion for the transfer of data from floating-point fields (format F) to packed numeric fields (format P) and vice versa, as well as from floating-point fields to alphanumeric fields (format A) and vice versa, has been improved. This may in some cases lead to different results. However, these results will be of a greater precision than with Natural 2.2.
NEE Impact	Natural Engineer will identify all relevant occurrences.
NEE Modification Category	3n SAG13/SAG08
NEE Modification	Manual.

13. Comparison and Assignment of Variable Array Ranges

Description	<p>With Natural 3.1, a comparison or assignment involving arrays with variable indexes will lead to an error at runtime (NAT1317) if an array range turns out to be actually a scalar once the actual values are assigned to the index variables.</p> <p>With Natural 2.2, such a comparison or assignment is allowed, but it is not consistent with the handling of constant scalars (as shown in the following example).</p> <p>Example (assuming $j = i + 1$):</p> <p>Natural 2.2:</p> <ol style="list-style-type: none"> 1. IF #A(i:j) = #B(m) is resolved as: IF #A(i) = #B(m) OR #A(j) = #B(m) 2. IF #A(i:j) = #B(m:n) is resolved as: IF #A(i) = #B(m) AND #A(j) = #B(n) <p>This means that if the values of 'm' and 'n' are equal, comparison 2 is resolved inconsistently.</p> <p>Natural 3.1:</p> <p>If the values of 'm' and 'n' are equal, comparison 2. Will cause a runtime error.</p>
NEE Impact	Natural Engineer will identify all comparisons or assignments using variable indexed arrays.
NEE Modification Type	3o SAG14
NEE Modification	Not Applicable

14. Error Messages NAT1117 and NAT0924 replaced by NAT0082

Description	In situations where Natural 2.2 displays error message NAT1117 (requested map not available) or NAT0924 (subroutine, GDA or external report not found), Natural 3.1 displays message NAT0082. This will lead to different results if you interrogate these message numbers in your applications.
NEE Impact	Natural Engineer will identify all references of NAT1117 and NAT0924.
NEE Modification Type	3p SAG15
NEE Modification	Automatic. All references to NAT1117 and NAT0924 will be modified to be NAT0082.

15. Obsolete Error Messages

Description	The following error messages have become obsolete; they no longer exist with Natural 3.1: NAT9000, NAT9100, NAT9101 and NAT9200.
NEE Impact	Natural Engineer will identify all references of NAT9000, NAT9100, NAT9101 and NAT9200.
NEE Modification Type	3q SAG16.
NEE Modification	Manual.

16. Changed System Variable *TPSYS

Description	Under TIAM (BS2000) *TPSYS contains 'TIAM' instead of 'RTIO'
NEE Impact	Natural Engineer will identify all references of 'RTIO'.
NEE Modification Category	3r SAG17.
NEE Modification	Automatic. All references of 'RTIO' will be modified to 'TIAM'.

17. Priority of PRINT/WORK FILE statements

Description	The NATPARM definitions of Print/Load files have over the JCL definitions. Special purpose ZAP NA32116 puts back Natural 2.2 functionality.
NEE Impact	Natural Engineer will identify all PRINT/WRITE WORK FILE statements. <i>Note: This may produce a lot of impacts. If you wish to remove this search from Natural Engineer then please modify the impact search criteria to remove READ WORK FILE and WRITE WORK FILE as search keywords.</i>
NEE Modification Category	3s SAG18
NEE Modification	Manual.

18. User Exit Modules copied from SYSEXT

Description	In general, the user exits (USR****N) located on FUSER (Natural 2.2) have to be replaced with the corresponding module from library SYSEXT on the FNAT of Natural 3.1.
NEE Impact	Natural Engineer will identify all USR..... (CALLNAT) references.
NEE Modification Type	3t SAG19
NEE Modification	Manual.

19. Internal Handling of AD=O

Description	With Natural 3.1, the internal handling of AD=O has changed. A CALLNAT/PERFORM parameter marked with AD=O is no longer passed to the subprogram/subroutine 'by reference' (that is, via its address) but 'by value'.
NEE Impact	Natural Engineer will identify all CALLNAT/PERFORM statements with parameter AD=O Specified.
NEE Modification Type	3u GSL01
NEE Modification	Manual.

20. LESS clause of EJECT Statement

Description	To enhance the clarity of programs and avoid possible ambiguities in the source code, the keyword LESS in Syntax 2 of the EJECT statement is no longer optional, but required. With Natural 2.2, the shortest possible form is: EJECT operand1 With Natural 3.1, it is: EJECT LESS operand1
NEE Impact	Natural Engineer will identify all EJECT statements without the LESS clause.
NEE Modification Type	3v GSL02
NEE Modification	Automatic. The LESS clause will be added to the EJECT statement.

21. ESCAPE TOP within AT START OF DATA

ESCAPE TOP and ESCAPE BOTTOM not allowed in ON ERROR blocks

Description	In Natural 3.1, you are no longer allowed to place an ESCAPE TOP statement within an AT START OF DATA statement block. It is also not permitted to place either an ESCAPE TOP or an ESCAPE BOTTOM within an ON ERROR BLOCK.
NEE Impact	Natural Engineer will identify all ESCAPE TOP statements in AT START OF DATA Blocks. Also, ESCAPE TOP and ESCAPE BOTTOM statements within ON ERROR blocks are identified.
NEE Modification Type	3w GSL03
NEE Modification	Manual.

22. Decimal Digits of Constant Values

Description	If the constant value specified after CONSTANT or INIT has more digits after the decimal point than the corresponding field, this does not lead to an error with Natural 2.2. With Natural 3.1, such inconsistency leads to error NAT0094 at compilation.
NEE Impact	Natural Engineer will identify all statements where the constant/initial value has more digits after the decimal point than the corresponding field.
NEE Modification Type	3x GSL04
NEE Modification	Manual.

23. TOP and LESS clauses of NEWPAGE statement

Description	To enhance the clarity of programs and avoid possible ambiguities in the source code, the keywords TOP and LESS OF the NEWPAGE statement are no longer optional, but required. With Natural 2.2, the shortest possible forms are: NEWPAGE EVEN NEWPAGE operand1 With Natural 3.1, they are: NEWPAGE EVEN TOP NEWPAGE LESS operand1
NEE Impact	Natural Engineer will identify all NEWPAGE statements without a TOP or LESS clause.
NEE Modification Type	3y GSL05
NEE Modification	Automatic. The TOP or LESS clause will get inserted into the NEWPAGE statement.

24. LS parameter and PRINT statement

Description	It is no longer possible to specify the LS parameter with the PRINT statement (as it has no effect anyway). With Natural 2.2, this does not lead to an error. With Natural 3.1, it leads to error NAT0934.
NEE Impact	Natural Engineer will identify all PRINT statements with the LS parameter specified.
NEE Modification Type	3z GSL06
NEE Modification	Automatic. The LS parameter will be removed from the PRINT statement.

25. MOVE RIGHT JUSTIFIED where target field is shorter than source field

Description	If the target field in a MOVE RIGHT JUSTIFIED statement is smaller than the sending field length, the resulting #value in the target field is truncated from the start of the sending field data. Example : 01 #A(A10) INIT <'ABCDEHIJKL'> 01 #B(A05) * MOVE RIGHT JUSTIFIED #A TO #B * Result under Natural 2.2, #B = ABCDE Result under Natural 3.1, #B = HIJKL
NEE Impact	Natural Engineer will identify all MOVE RIGHT JUSTIFIED statements where the target field is shorter than the source.
NEE Modification Type	3l GSL07
NEE Modification	Manual.

26. BEFORE BREAK within IF condition

Description	At compile time, it is no longer possible to code a BEFORE BREAK statement within an IF condition. This syntax compiles under OS390 for Natural 2.2, 2.3 and 3.1. However, there is a ZAP (NA44082) to make Natural 3.1.4 compatible with PC Natural 4.1.2. Compilation error NAT0309 – Invalid positioning of AT BREAK/END condition, will be returned during compilation.
NEE Impact	Natural Engineer will identify all BEFORE BREAK statements within an IF condition.
NEE Modification Type	31 GSL08
NEE Modification	Manual.

27. Invalid settings for SUBSTRING

Description	Since Natural 3.1, Natural checks at compile time that the SUBSTRING options are valid. The value of the offset plus the length of the sub-string must be less than or equal to string length. If this is not the case, then compilation error 'NAT0471 Invalid operands in SUBSTRING option' will be returned during compilation. Under Natural 2.2, the user would receive a runtime error.
NEE Impact	Natural Engineer will identify where the offset plus the length used in a SUBSTRING clause, exceed the length of the field. This is applicable to EXAMINE, MOVE, EXAMINE TRANSLATE, COMPRESS, COMPUTE, ASSIGN and SEPARATE statements. <i>Note: If the offset is a variable, no checking is carried out. Also, if the length is a variable, then the check is the offset against the field length.</i>
NEE Modification Type	32 GSL09
NEE Modification	Manual

28. MOVE BY NAME with numeric redefinition

<p>Description</p>	<p>If a MOVE BY NAME statement references fields which have been redefined from alpha to numeric and both the source and target fields are the same length, then you will receive different results under Natural 3.1.</p> <p>Example:</p> <pre> DEFINE DATA LOCAL 01 #GROUP1 02 #ALPHA (A10) 02 REDEFINE #ALPHA 03 #ALPHA1 (A1) 03 #NUMERIC (N9) 01 #GROUP2 02 #ALPHA (A10) 02 REDEFINE #ALPHA 03 #ALPHA1 (A1) 03 #NUMERIC (N9) END-DEFINE MOVE BY NAME #GROUP1 TO #GROUP2 WRITE 'RESULT:' #GROUP1 #GROUP2 END </pre> <p>Result under Natural 2.2, RESULT:</p> <p>Result under Natural 3.1, RESULT: 000000000</p> <p><i>(Note: the numeric redefinition now contains zeros.)</i></p>
<p>NEE Impact</p>	<p>Natural Engineer will identify any MOVE BY NAME statements if the source and target fields are:</p> <ul style="list-style-type: none"> ▪ Both part of a redefine of an alpha field. ▪ Both have a format of 'N' (numeric). ▪ Both have the same length.
<p>NEE Modification Type</p>	<p>33 GSL10</p>
<p>NEE Modification</p>	<p>Manual</p>

NATRPC

The search keyword NATRPC can be used to locate statements that may be affected by future versions of Natural, in particular with the Natural Remote Procedure Call (RPC). The impacted statements for Natural RPC are detailed below showing their respective current and future functionality:

Current State

Statement	Description
TERMINATE	Using this statement causes the server to be terminated, regardless of conversations that may still be open.
FETCH,	Using these statements causes the CALLNAT context to get lost.
RUN,	Upon a FETCH, RUN or STOP statement, the server detects that it has lost its CALLNAT context and returns a corresponding Natural error message to the client; at that time, however, the statement has already been executed by the server.
STOP	
	Exception: This does not apply to FETCH RETURN.
INPUT	Input values are unpredictable when the input data are read from a file (and not from the stack).

Future State

Statement	Description
FETCH, RUN, INPUT	Not Permitted.
STOP, TERMINATE	Same as ESCAPE ROUTINE.

Natural Engineer Analysis and Modification

Using the search keyword NATRPC, Natural Engineer will identify those statements that may be affected with future versions of Natural.

Automatic modification will also be performed for instances of STOP and TERMINATE where the statement will be replaced with ESCAPE ROUTINE.

OBJECT BUILDER

The search keyword OBJECT BUILDER is used to specify line ranges within an object, which will then be used to create a new subprogram object containing the specified lines and a Parameter Data Area object containing any parameter data that is required. The original object is then modified to call the new subprogram.

This process is part of the Application Restructuring processes available within Natural Engineer.

Note: For more information on the Object Builder process refer to the Natural Engineer Application Restructuring for Windows manual.

PORTING

The search keyword PORTING is used to identify any statements that may affect an application being migrated to alternate platforms.

The search keyword uses a sub-set of criteria, which are specified using the options provided by the Keyword Value Options button from the Impact Search Criteria screen.

Note: For more information on the Keyword Value Options button refer to the section [Impact Criteria window](#).

No automatic modification is available for this search keyword.

Porting Preferences Window

The Porting Preferences window is accessed by using the Keyword Value Options button, which will contain the text '**Porting Options**', from the Impact Criteria screen.

The following Figure 3-11 illustrates the Porting Preferences screen.

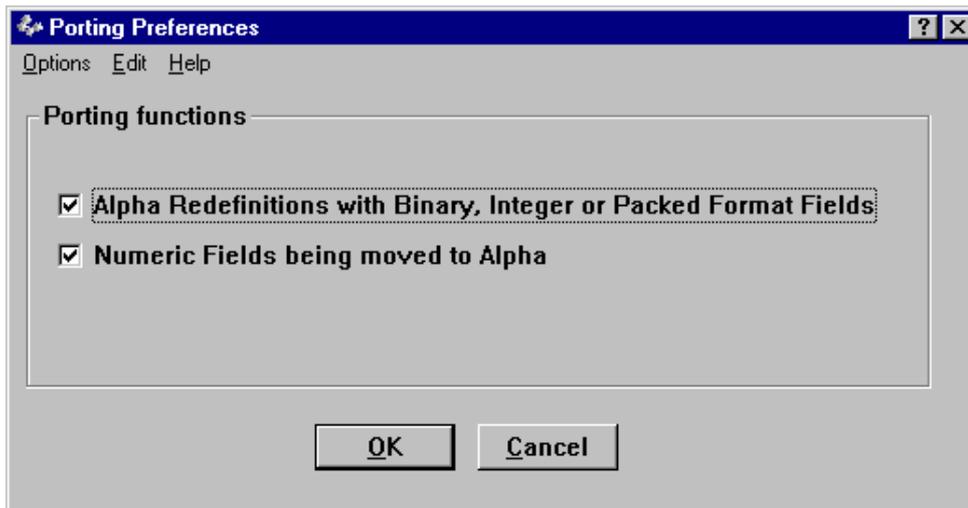


Figure 3-11 Porting Preferences screen

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Natural Engineer Application Analysis & Modification

MENU ITEMS	OPTIONS	DESCRIPTION
Options	Close	Will close the Porting Preferences screen and return back to the Impact Criteria screen.
Edit	Select All	Selects all the Porting sub-criteria.
	Deselect All	Deselects all the Porting sub-criteria.
Help		Invokes the Porting help.

SCREEN ITEMS	DESCRIPTION
Porting Functions	<p>Each available Porting sub-criteria is listed and if selected will be used during Impact execution. Each sub-criteria can be selected or deselected individually. Available sub-criteria are:</p> <p>Alpha Redefinitions with Binary, Integer or Packed Format Fields</p> <p>Impact will look for any alpha variables that have redefinition variables defined using format of Binary, Integer or Packed.</p> <p>No automatic modification is available.</p> <p>Numeric Fields being moved to Alpha</p> <p>Impact will look for any numeric variables that are being moved to alpha variables.</p> <p>No automatic modification is available.</p>

BUTTON NAME	DESCRIPTION
OK	Saves the Porting sub-criteria and returns back to the Impact Criteria screen.
Cancel	Cancels any selections made and return back to the Impact Criteria screen.

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