

Natural Engineer

Version 4.3.1

Installation Guide

Manual Order Number: NEE431-010ALL

This document applies to Natural Engineer version 4.3.1 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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TABLE OF CONTENTS

ABOUT THIS MANUAL.....	1
Purpose of this manual	1
Target Audience	1
Typographical Conventions used in this manual	2
How this manual is organized	3
Terminology	4
Related Literature	7
1. INSTALLATION ON THE PC	9
Chapter Overview.....	9
Installation Prerequisites.....	9
Installation Process	10
Natural Parameter settings.....	11
2. INSTALLATION ON THE MAINFRAME.....	13
Chapter Overview.....	13
Changes in processing for Natural Engineer 4.3.1	14
Installation Jobs on the Mainframe.....	15
Mainframe Prerequisites.....	16
The OS/390 Installation Tape.....	17
The VSE Installation Tape	19
The BS2000/OSD Installation Tape	21
Mainframe Installation Steps.....	23
Mainframe Customization	30
Natural Engineer Processes and Related Jobs	33

Natural Engineer Installation Guide

3. ENVIRONMENT CONSIDERATIONS.....	39
Chapter Overview.....	39
Architecture.....	40
Environment Sizing.....	44
INDEX	47

ABOUT THIS MANUAL

Purpose of this manual

This manual contains the Installation Manual for Natural Engineer version 4.3.1

Target Audience

The target audience for this manual is intended to be any User of Natural Engineer 4.3.1 as well as Systems Administrators responsible for installing and configuring the product.

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 describes all aspects of installing Natural Engineer version 4.3.1 on supported platforms, namely Windows NT, OS/390, BS2000/OSD and VSE.

This manual should be read carefully before installing and using the product.

Chapter	Contents
1	Describes how to install and customize Natural Engineer on your PC for the purpose of execution under Natural for Windows NT.
2	Describes the installation procedure on the supported mainframe platforms (OS/390, VSE, BS2000/OSD).
3	Describes the environment considerations for sizing and architecture when using Natural Engineer under Windows NT.

Terminology

It is assumed that you are familiar with general Natural and mainframe terminology, as well as the terms and concepts relating to MS-Windows environments. 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.

Natural Engineer Installation Guide

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 (NEE431-006ALL)

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 (NEE431-008ALL)

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 4.3.1.

3. Natural Engineer Installation Guide (NEE431-010ALL)

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

4. Natural Engineer Administration Guide (NEE431-040WIN)

Natural Engineer Administration Guide (NEE431-040MFR)

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 (NEE431-020WIN)

Natural Engineer Application Management (NEE431-020MFR)

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

6. Natural Engineer Application Documentation (NEE431-022WIN)

Natural Engineer Application Documentation (NEE431-022MFR)

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.

Natural Engineer Installation Guide

7. Natural Engineer Application Analysis and Modification (NEE431-023WIN)

Natural Engineer Application Analysis and Modification (NEE431-023MFR)

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.

8. Natural Engineer Application Restructuring (NEE431-024WIN)

Natural Engineer Application Restructuring (NEE431-024MFR)

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 (NEE431-080WIN)

Natural Engineer Utilities (NEE431-080MFR)

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

10. Natural Engineer Reporting (NEE431-025ALL)

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] (NEE431-026MFR)

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

INSTALLATION ON THE PC

Chapter Overview

This chapter explains how to install and customize Natural Engineer on your PC for the purpose of execution under Natural for Windows NT.

This information is organized in the following sections:

- Installation Prerequisites.
- Installation Process.

Installation Prerequisites

Before installing Natural Engineer, the following must already be installed on your PC:

- Windows NT with Natural 4.1.2.1 or above.
- Microsoft Internet Explorer™ (version 4 or above) or Netscape™ (optional).
- Microsoft® Visio 2000® (optional).

In addition ADABAS must be installed on your PC or accessible on a networked server.

It is recommended that the minimum screen size should be set to 1024 x 768.

Installation Process

The installation process of Natural Engineer on PCs consists of a series of steps of manual modifications and additions to your current environment.

The README.TXT file guides you through the manual steps required.

You are recommended to verify the installation process when you are finished.

► To install Natural Engineer

1. Insert the supplied CD into the CD-ROM drive of your PC.
2. Open the README.TXT file and follow the instructions.

The README.TXT file tells you how to:

- Set up the Natural Engineer directories.
 - Create an Adabas database and create a repository file using the DBA Workbench.
 - Set the profile/nucleus parameters and Natural Engineer parameters.
 - Load the Natural Engineer programs and sample application.
 - Verify the NATENG.INI file.
 - Check the AUTOEXEC.BAT file.
 - For Windows NT users who do not use AUTOEXEC.BAT, set environment variables.
 - Run conversion routines if upgrading from Natural Engineer version 4.1 or Natural Engineer version 4.2.
3. Reboot your PC.

► **To verify the installation**

1. Start Natural Engineer by choosing the Natural Engineer icon.
2. Using the supplied application HOSPITAL in x:\PROGRAM FILES\SOFTWARE AG\NEE\Vvrs\SYSOBJH\HOSPITAL.SAG, test your installation by executing the Application, Environment and Analysis processes as described in the *Natural Engineer Application Management* manual.
3. Check the Microsoft® Visio 2000® Interface as follows:
 - Confirm that the products work independently of Natural Engineer.
 - Confirm that the product works from Natural Engineer using the Structure Flow Diagram from the Environment menu using the sample application HOSPITAL.

Natural Parameter settings

The Natural parameter settings are independent of the number of lines of code being processed. In fact, Natural Engineer does not require the settings listed below. However, for optimum performance they are the recommended minimum set for any Natural Engineer session. The following parameters are relevant for Natural on the PC platforms.

Parameter	Setting	Comment
BPSIZE	2000K	Set at least a 2MB Bufferpool.
BPSFI	TRUE	Set BPSFI on.

Other Natural Parameter settings have to be set for Natural Engineer such as LFILE 96. This depends on what Repository (DBID, FNR) has been created.

Note: For more information on the NATPARM settings required during installation refer to the README.TXT file found in the X:\PROGRAM FILES\SOFTWARE AG\NEE\V431 folder, where X: is the drive on which Natural Engineer has been installed.

INSTALLATION ON THE MAINFRAME

Chapter Overview

This chapter describes the installation procedure on the supported mainframe platforms (OS/390, VSE, BS2000/OSD). This information is organized in the following sections:

- Changes in processing for Natural Engineer version 4.3.1.
- Installation Jobs on the Mainframe.
- Mainframe Prerequisites.
- The OS/390 Installation Tape.
- The VSE Installation Tape.
- The BS2000/OSD Installation Tape.
- Mainframe Installation steps.

Changes in processing for Natural Engineer 4.3.1.

Extract Process Changes

Release 4.3.1 of Natural Engineer has introduced a few changes in the processing related to the Extract process.

JCLEXTR2 is no longer required by the NATRJE on-line job submission system. Please take time to review the JCL text member JCLEXTR3 for your platform and apply relevant changes to your current JCL.

In batch stand alone JCL; work file 2 is no longer required. This was pointing to member CEXT in the NEEvrs.SRCE dataset. Please note that this is no longer delivered as part of the Natural Engineer package.

Task Scheduler

Natural Engineer version 4.3.1 introduces the concept of scheduling tasks. Tasks are set up by the on-line system. For mainframe platforms, within dataset NEEvrs.JOBS, member TASKSCH contains sample JCL for processing the tasks and submitting further jobs to carry them out. Therefore, a task scheduled by the on-line system will not execute until the TASKSCH job has been submitted and if the scheduled task's criteria are met.

In order to allow the scheduled tasks to execute, it is recommended that the TASKSCH job is entered into the sites automated operations scheduler to be executed at pre-determined times.

Changes to JCL text members for NATRJE

Due to the task scheduler using the NATRJE JCL text members when building jobs for carry out the scheduled tasks, several changes have been made to the NATRJE on-line job submission system. Please review the supplied JCL text members for your platform.

Changes relate to the data set names (i.e., no longer contain XXXXXXXX which would have been translated to the user identifier of the submitter), condition codes (OS/390), and changes to the parameter passed to MFRJEP02 (i.e., extra TTTT at the end).

Installation Jobs on the Mainframe

The installation of Natural Engineer on mainframe platforms is performed by installation jobs. These jobs are either adapted “manually” or generated by SYSTEM MAINTENANCE AID (SMA).

For each step of the installation procedure described below, the job number of a job performing the respective task is indicated. This job number refers to an installation job generated by SMA. If you are not using SMA, a sample installation job of the same number is provided in the job library on the installation tape; you must adapt this example job to your requirements. Please note that the job numbers on the tape are preceded by a product code (for example, NEEI061 or NEEI050).

Using SYSTEM MAINTENANCE AID

If you are using Software AG’s SYSTEM MAINTENANCE AID (SMA) for the installation process, please note the following before generating jobs:

1. Load the SMA table data as described in the SYSTEM MAINTENANCE AID manual (if you have not already done so).
2. Set NEE431 in the list of available products for your environment to “TO BE INSTALLED”.
3. Set the following SMA parameters specific to Natural Engineer:

In group OPTION:

NEE-FIRST-INSTALL = Y (for first-time installation of Natural Engineer)

NEE-FIRST-INSTALL = N (for migration installation of Natural Engineer)

In group FILNUM:

FNEE1 = <file number of Natural Engineer Repository>

FNEE1-DBID= <database number of Natural Engineer Repository>

2

Natural Engineer Installation Guide

Mainframe Prerequisites

The following products must be installed before you install Natural Engineer:

NATURAL

Natural version 3.1.4 or above.

ADABAS

Adabas version 6.2 or above.

The OS/390 Installation Tape

Tape Contents

The installation tape contains the datasets listed in the table below. The sequence of the datasets is shown in the Report of Tape Creation that accompanies the installation tape. The notation *vrs* in Dataset Name represents the version number, release level and SM level of the product.

Dataset Name	Contents
NEEvrs.SRCE	Source library containing member CINI(initialization parameters).
NEEvrs.JOBS	Job library with sample JCL for the Natural Engineer process.
NEEvrs.LOAD	Load library containing member NATTABLE, required to overcome the restriction of Natural supporting only 32KB parameter data areas.
NEEvrs.INPL	Natural modules in INPL format.
NEEvrs.ERRN	SYSERR messages for Natural Engineer.
NEEvrs.SYS1	Natural Engineer system file in ADAULD format.
NEEvrs.EXPL	Example application library.
NEEvrs.HELP	Natural Engineer Help File.
NEEvrs.IRES	Supplied Impact Search Criteria.

Copying the Tape Contents to Disk

If you are not using SMA, follow the procedure described below.

1. Copy the job dataset NEEvrs.JOBS from tape to disk using the sample JCL below. The following values must be supplied in the JCL:
 - In the dataset names, replace vrs with the current version number of the datasets.
 - With the SER parameter, replace XXXXXX with the volume serial number of the tape.
 - With the LABEL parameter, replace x with the sequential number of the dataset on the release tape (see Report of Tape Creation).
 - With VOL=SER parameter, replace YYYYYY with the volume serial number of the disk pack.
 - With the UNIT parameter, replace ZZZZZZ with the device type being used.
2. Modify the sample JCL to meet your site's requirements for job card, dataset names, SYSOUT class, UNIT, and disk-volume serial number. Replace the variables below with the required information:

```
//          JOB   CARD

//NEECOPY   EXEC  PGM=IEBCOPY
//SYSPRINT  DD   SYSOUT=A
//IN1      DD   DSN=NEEvrs.JOBS,DISP=OLD,UNIT=TAPE,
//          VOL=(,RETAIN,SER=XXXXXX),LABEL=(x,SL)
//OUT1     DD   DSN=SAGLIB.NEEvrs.JOBS,DISP=(NEW,CATLG,DELETE),
//          UNIT=ZZZZZ,VOL=SER=YYYYYY,SPACE=(CYL,(1,1,5))
//SYSIN    DD   *
C I=IN1,O=OUT1
/*
```

3. Adapt and run job TAPE from the job dataset to copy the load and SRCE, libraries from tape to disk. The sample jobs directly use the sequential datasets from tape.

The dataset type and the space each dataset requires on disk are shown in the Report of Tape Creation.

The VSE Installation Tape

Tape Contents

The installation tape contains the datasets listed in the table below. The sequence of the datasets is shown in the Report of Tape Creation that accompanies the installation tape. The notation vrs in Dataset Name represents the version number, release level and SM level of the product.

Dataset Name	Contents
NEEvrs.LIBR	Natural Engineer installation libraries.
NEEvrs.INPL	Natural modules in INPL format.
NEEvrs.ERRN	SYSERR messages for Natural Engineer.
NEEvrs.SYS1	Natural Engineer system file in ADAULD format.
NEEvrs.EXPL	Example application library.
NEEvrs.HELP	Natural Engineer Help File.
NEEvrs.IRES	Supplied Impact Search Criteria.

Copying the Tape Contents to Disk

If you are not using SYSTEM MAINTENANCE AID, follow the procedure described below.

1. Copy the sub-library containing the sample installation jobs from tape using the following JCS:

```
* $$ JOB JNM=NEEJOBS,CLASS=0,DISP=D,LDEST=*,SYSID=1
* $$ LST CLASS=A,DISP=D
// JOB NEEJOBS
// ASSGN SYS006,cuu,VOL=XXXXXX
// MTC REW,cuu
// MTC FSE,SYS006,nn
* Tape positioned tape mark nn
* *** NOW PROCESSING NEEvrs.LIBR - SUBLIBRARY NEEvrsJ ***
// EXEC LIBR,PARM='MSHP'
  RESTORE SUBLIB=SAGLIB.NEEvrsJ:SAGLIB.NEEvrsJ -
    TAPE=SYS006 -
    LIST=YES -
    REPLACE=NO
/*
// MTC REW,SYS006
/*
/&
* $$ EOJ
```

- The notation cuu represents the physical unit address of the tape drive.
 - The notation XXXXXX represents the volume serial number of the tape.
 - The notation nn represents the file sequence number in the Report of Tape Creation.
 - The notation vers represents the version number of the product.
2. Adapt and submit job NEETAPE from this job library to restore the Natural Engineer sub-library from tape and make it known to MSHP.

All further datasets will be directly used from tape by the installation jobs.

The BS2000/OSD Installation Tape

Tape Contents

The installation tape contains the datasets listed in the table below. The sequence of the datasets is shown in the *Report of Tape Creation* that accompanies the installation tape. The notation *vrs* in Dataset Name represents the version number, release level and SM level of the product.

Dataset Name	Contents
NEEvrs.SRCE	Source library containing members CINI and PARAMS (initialization parameters, Natural dynamic parameters).
NEEvrs.JOBS	Job library with sample JCL for the Natural Engineer process.
NEEvrs.PAMS	Library containing member NATTABLE, required to overcome the restriction of Natural supporting only 32KB parameter data areas.
NEEvrs.INPL	Natural modules in INPL format.
NEEvrs.ERRN	SYSERR messages for Natural Engineer.
NEEvrs.SYS1	Natural Engineer system file in ADAULD format.
NEEvrs.EXPL	Example application library.
NEEvrs.HELP	Natural Engineer Help File.
NEEvrs.IRES	Supplied Impact Search Criteria.

Copying the Tape Contents to Disk

If you are not using SMA, use the procedure described below. In this procedure, the following values must be supplied:

- In the dataset names, replace nnn with the current version number of the datasets.
- Replace all xxxxxx with the volume serial number of the tape.

► To copy the datasets from tape to disk

1. Copy the job dataset NEEennn.JOBS from tape to disk using the BS2000/OSD utility PERCON or EDT.

- If you use PERCON, issue the following commands:

```
/FILE NEEennn.JOBS,VOL=xxxxxxx,DEV=T9G -
/      ,FCBTYPE=,RECSIZE=,BLKSIZE=,RECFORM= -
/      ,STATE=FOREIGN,FSEQ=UNK,LINK=PCIN
/FILE P.NEEennn,LINK=PCOUT
/EXEC PERCON
END
```

- If you use EDT, issue the following commands:

```
/FILE NEEennn.JOBS,VOL=xxxxxxx,DEV=T9G -
/      ,RECSIZE=,BLKSIZE=,RECFORM= -
/      ,STATE=FOREIGN,FSEQ=UNK,LINK=EDTSAM
/EXEC EDT
@ READ '/'
@ SY '/REL EDTSAM'
@ WRITE 'P.NEEennn'
@ HALT
```

2. Issue the following command:

```
/CALL P.NEEennn,PRODUCT=NEEennn
```

An example job library “LIB.NEEennn” is created from the procedure dataset.

3. Adapt job “E.NEETAPE” from the example job library to the requirements of your site.
4. Issue the following command to run the job, which copies all datasets from tape to disk:

```
/E LIB.NEEennn(E.NEETAPE)
```

Mainframe Installation Steps

Perform the following steps after copying the tape contents to disk.

1. Establish Natural Engineer System File

SMA Reference: Job I050, Step 7000

- Load the Natural Engineer System File contained in dataset NEEvrs.SYS1.

2. Run Conversion Programs

SMA Reference: Job I051, Step 7010 + 7030 + 7040

Natural Engineer version 4.1 to Natural Engineer version 4.2

If you have a current Natural Engineer version 4.1 Repository file that you wish to convert for use with Natural Engineer version 4.3 the following modifications need to be applied.

Invert a super descriptor use the Adabas utility ADAINV INVERT. To increase a fields length use the Adabas utility ADADBS CHANGE and to add new fields use the Adabas utility ADADBS NEWFIELD.

ADADBS

1. Add the following fields to the end of the REPOSITORY file.

01 , UL, 8, A, NU

ADAINV

2. Invert Super descriptor N9= RT(1,1), UL(1,8), AB(1,8), UT(1,7)

If you have a current Natural Engineer version 4.1 or 4.2 Repository file that you wish to convert for use with Natural Engineer 4.3, the following modifications need to be applied.

3. Invert Super descriptor NA=AA(1,8),AB(1,8),AK(1,32)
4. Invert Super descriptor NB=AA(1,8),AB(1,8),AC(1,32)

3. Modify, Reassemble, and Link the NATPARM Module

SMA Reference: Job I060, Step 0010 (BS2000/OSD, VSE), Step 0010 + 0015 (OS/390)

1. Modify the NATPARM module used for the Natural Engineer process as described in the table below.

Note: As an alternative to this step, users can use dynamic parameters in their Natural environment. The size parameters are recommendations only. You may have to adapt these values to your particular environment.

Recommended settings:

NETWORK=((1-24),AM=STD,OPEN=ACC,CLOSE=CMD)

NTPRINT=((1-2),OPEN=ACC,AM=STD,CLOSE=FIN)

Parameter	Setting
DELETE=OFF	Natural Engineer uses an Assembler module to overcome the limitation of 32K of space within a PDA. This parameter means that once the Assembler program has been loaded, keep it resident for the session.
DATSIZE=256	This is the maximum value. It is recommended to cover all values that may have been in place when an object was compiled.
LFILE=(095,001,012)	Location of the FDIC file. Logical number is 095 Physical Database is 001. Modify as required for the environment. Physical File Number is 012. Modify as required for the environment.
LFILE=(096,001,010)	Location of the Natural Engineer Repository file. Logical number is 096 Physical Database is 001. Modify as required for the environment. Physical File Number is 010. Modify as required for the environment.
LFILE=(097,001,011)	Location of the FUSER file. Logical number is 097 Physical Database is 001. Modify as required for the environment. Physical File Number is 011. Modify as required for the environment.

Note: Ensure that Printer 19 is present when executing batch modification functions or when starting the online front-end to Modification Categorization

Note: OS/390 and BS2000/OSD can dynamically load the NATTABLE module. Under OS/390, specify the NEEvrs.LOAD as a steplib in the JCL. For BS2000/OSD, NATTABLE can be dynamically linked as BLSLIB&&, such as:

```
/ SET-FILE-LINK FILE-NAME=$SAG.NEE431.MOD, -
/ LINK-NAME=BLSLIB&&
```

2. For VSE, in the CSTATIC parameter, add the NATTABLE object i.e., CSTATIC = (NATTABLE).
3. Assemble and link the NATPARM module.

4. Link the Batch NATURAL Nucleus

SMA Reference: Job I060, Step 0020 (OS/390, VSE) Step 3801 (BS2000/OSD).

1. Find the JCL used to link your current batch Natural nucleus.
This will ensure that all INCLUDE statements specified when you built your current batch Natural nucleus are supplied in this step.
2. In the INCLUDE statement for the NATPARM, specify the name of the NATPARM module that you reassembled in Step 3.
3. For VSE, in the INCLUDE statement add the location of the NATTABLE object.
4. Link the Natural nucleus.

5. Load Natural Engineer System Programs

SMA Reference: Job I061, Step 7000

- The Natural Engineer system programs are contained in the dataset NEEvrs.INPL. Load them to your Natural FNAT and FUSER system files using the Natural utility INPL.

6. Load Natural Engineer SYSERR messages

SMA Reference: Job I061, Step 7001

- The Natural Engineer SYSERR messages are contained in the dataset NEEvrs.ERRN. Load them to your Natural FUSER system files using the Natural utility ERRLODUS.

7. Load Example Application

SMA Reference: Job I061, Step 7002

- ❑ The Natural Engineer example application is contained in the dataset NEEvrs.EXPL. Load it to your Natural FNAT and FUSER system files using the Natural utility INPL.

8. Run Conversion Programs

SMA Reference: I082, Step 7000

If you are migrating from NEE 4.1.1 or NEE 4.1.2 to NEE 4.3.1, you will need to execute NEE421UP from the NEEvrs.JOBS dataset. This will update the existing Audit Records and any saved criteria.

SMA Reference: I082, Step 7001

If you are migrating from NEE 4.1 or NEE 4.2 to NEE 4.3.1, you will need to execute NEE431UP from the NEEvrs.JOBS dataset. This will update steplib cross-reference records for improved processing, soft link records and internal record types.

9. Load the Natural Engineer Jobs OS/390

SMA Reference: Job I200, Steps 7001-7011.

7001	NATDELAP	DELAPP
7002	NATEXTMI	EXTMIS
7003	NATEXTRA	EXTRACT
7004	NATIMPAC	IMPACT
7005	NATLOAD	LOAD
7006	NATREPEN	REPORTEN
7007	NATREPGL	REPORTGL
7008	NATREPIM	REPORTIM
7009	NATREPMO	REPORTMO
7010	NATMODIF	MODIFY
7011	NATTASK	TASKSCH

- The Natural Engineer sample jobs are contained in the JOBS or LIBR dataset, depending on the operating system. Load the sample jobs to your designated Natural Engineer job library.

The sample jobs supplied are for running in Batch Mode when not using the Natural Engineer RJE function.

10. Modify Sample Jobs

1. The Job card statement will need to be set up with the correct site standard Job Name convention applicable at your site. The Job Class will also need to be set to a valid class applicable at your site. (It is recommended that you set this to a class that equates to a 'medium' run time as a default for ALL jobs.)
 2. Each of the Work File data set names contains a reference to the Application being run through Natural Engineer. This can be identified in the sample jobs by looking for 'AAAAAAA' within the data set names. It is recommended that you change this for each Application that you are running through Natural Engineer to avoid overwriting any of the datasets.
 3. Work File 1 contains the Natural Engineer Initialization parameters (CINI) and is required in ALL the sample Jobs provided. It is set up as a PDS member called 'CINI' (in NEEvrs.SRCE). For each Application you are running you will need to edit CINI to reflect the correct Application Library name. This can be identified within CINI as 'LIBRARY=AAAAAAA'.

11. Natural Engineer RJE Jobs

- Any batch jobs submitted via the Natural Engineer RJE function utilize JCL text members to build up the jobs. These are loaded as part of the install process.

The user must modify these jobs and the Natural text members according to their requirements.

Note: For OS/390, the JCL is supplied within library SYSNEEM. These should be copied to the SYSNEE library.

For BS2000/OSD, the JCL is supplied within library SYSNEEB. These should be copied to the SYSNEE Library.

For VSE, the JCL is supplied within library SYSNEEV. These should be copied to the SYSNEE Library.

When running under VSE, the minimum partition recommended to execute Natural Engineer batch jobs is 8MB.

12. General Adaptions

1. Supplied member name is ###CINIX. If this is a new installation rename to ###CINI. If this is an existing installation, check parameters in ###CINIX and see if they need transferring to existing ###CINI file.
2. Supplied member name ###DEFnn. If this is a new installation rename to ###DEF01. This contains the default values for the Multi-Search feature introduced in NEE 4.3.1 impact analysis.
3. JCLSTART - this contains the Job Card statement and needs to be amended with the correct site standard Job Name convention applicable at your site. The Job Class will also need to be set to a valid default class applicable at your site. This can be overwritten using the Natural Engineer RJE Job submission screen.
4. The Application name associated with each Work File data set is handled automatically by Natural Engineer RJE function.

13. NATURAL SECURITY Considerations

To run Natural Engineer under Natural Security:

- ❑ Define library SYSNEE to Natural Security for all Platforms.
- ❑ Define library NEEDB to Natural Security for all Platforms.
- ❑ Define library HOSPITAL to Natural Security for all Platforms.
- ❑ Define library SYSNEEM to Natural Security for OS/390.
- ❑ Define library SYSNEEV to Natural Security for VSE.
- ❑ Define library SYSNEEB to Natural Security for BS2000.

14. Loading Natural Engineer Help System

SMA Reference: JOB I500, Step 7010

To run the load of the Natural Engineer Help System, execute member HELPLOAD from the NEEvrs.JOBS dataset. This will delete the existing Natural Engineer help and replace it with the new version of the help from NEEvrs.HELP dataset.

15. Loading Natural Engineer Sample Impact Criteria

SMA Reference: JOB I500, Step 7020

To run the load of the sample Natural Engineer impact search criteria, execute member LOADIRES from the NEEvrs.JOBS dataset. This will overwrite the existing sample impact search criteria.

16. Verify the Installation

- ❑ To confirm that the installation was successful, follow the procedure described in the *Natural Engineer Application Management* manual against the supplied example application library.

Mainframe Customization

Setting Initialization Parameters

The member CINI is on the NEEvrs.SRCE dataset. This member contains the following parameters:

Section/Parameters	Meaning
(APPLICATION)	Application Section.
LIBRARY=AAAAAAAA	Name of application being processed.
PROGRAM=*	All objects to be processed. Used to limit some reports.
(LOAD)	Load Section.
REPLACE=Y	Load will replace existing data.
(EXTRACT)	Extract Section.
ELETAB=20000	Number of elements within an object.
VARTAB=2000	Number of variables within an object.
DDMCACHE=5	Number of DDMs to hold in memory.

Section/Parameters	Meaning
(IMPACT)	Impact Section.
IOR=Y	Inter-Object Tracing.
MODE=RE-ENG	Impact Mode of Natural Engineer.
VERSION=nn	Impact Version to be used.
(MODIFY)	Modify Section.
COMPONENT_OBJECT_NAME=#####*%	Object Builder default name template.
COMMENT-OLD-LINE=Y	During modification, whether or not to comment the original line in the modified object.

Modifying Natural Engineer Jobs

The jobs which execute the Natural Engineer Process in stand-alone batch mode are contained in the NEEvrs.JOBS dataset and for using Natural Remote Job Entry (NATRJE) the JCL is supplied in Natural text members.

The user must modify these jobs and the Natural text members according to their requirements.

Note: For OS/390, the JCL is supplied within library SYSNEEM. These should be copied to the SYSNEE library.

For BS2000/OSD, the JCL is supplied within library SYSNEEB. These should be copied to the SYSNEE library.

For VSE, the JCL is supplied within library SYSNEEV. These should be copied to the SYSNEE library.

Supplied Natural Engineer Stand-alone Batch Jobs

The following members of NEEvrs.JOBS are supplied.

Extract and Load Members	Description
EXTMIS	Extract Missing Objects.
EXTRACT	Extract Application.
LOAD	Load Repository.

Impact Member	Description
IMPACT	Impact Execution.

Data Modification Member	Description
MODIFY	Execute Modification for all Objects.

Report Members	Description
REPORTGL	Global Reports.
REPORTIM	Impact Reports.
REPORTMO	Modification Reports.
REPORTEN	Application Reports.

Deletion Members	Description
DELAPP	Application Delete.

Natural Engineer Processes and Related Jobs

Global Changes for OS/390

The following global changes should be made to stand-alone batch jobs and NATRJE NATURAL text members for OS/390.

The user should change the following items within the supplied JCL to their site standards:

Value	Description
UNIT=3380	Specify correct UNIT type.
VOL=SER=XXXXXX	Specify correct DASD volume.
PGM=NAT314BA	Specify correct batch Natural program.
DSN=NEE431.LOAD	Specify name of supplied NEEvrs.LOAD.
DSN=NEE431.SRCE	Specify name of supplied NEEvrs.SRCE.
DSN=NAT.LOAD	Specify name of batch Natural steplib.
DSN=ADA.LOAD	Specify name of Adabas Steplib.
DB=025	Specify normal database for ADARUN parameters.
SVC=233	Specify correct SVC number for ADARUN parameters.
DEVICE=3380	Specify correct DEVICE for the database.
AAAAAAA	Specify name of application to be processed.

Global Changes for BS2000/OSD

The following global changes should be made to stand-alone batch jobs for BS2000/OSD.

The user should change the following items within the supplied JCL to their site standards.

Value	Description
LIB.NEE	Specify name of supplied NEEvrs.JOBS.
NEE431.SRCE	Specify name of supplied NEEvrs.SRCE.
AAAAAAAA	Specify name of application to be processed.

The user should also ensure that the job card and work file names supplied are altered to their site standards.

Extract and Load Processes

Extract Missing Objects

For stand-alone batch job submission, the user should execute member EXTMIS from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of EXTMIS is comprised of the following Natural text members:

```
JCLSTART
JCLEXTM1
JCLEXTM2
JCLEXTM3
JCLLAST
```

Extract Application

For stand-alone batch job submission, the user should execute member EXTRACT from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of EXTRACT is comprised of the following Natural text members:

```
JCLSTART
JCLEXTR1
JCLEXTR3
JCLLAST
```

Load Repository

For stand-alone batch job submission, the user should execute member LOAD from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of LOAD is comprised of the following Natural text members:

```
JCLSTART
JCLLOAD1
JCLLOAD2
JCLLAST
```

Extract and Load

For stand-alone batch job submission, the user should execute member EXTRACT and then member LOAD from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of EXTRACT and LOAD comprises the following Natural text members:

```
JCLSTART
JCLEXTR1
JCLEXTR3
JCLLOAD1
JCLLOAD2
JCLLAST
```

2

Natural Engineer Installation Guide

Extract Load and Impact

For stand-alone batch job submission, the user should first execute member EXTRACT and then member LOAD followed by member IMPACT, from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of EXTRACT, LOAD and IMPACT comprises the following Natural text members:

```
JCLSTART
JCLEXTR1
JCLEXTR3
JCLLOAD1
JCLLOAD2
JCLIMPX1
JCLIMPX2
JCLLAST
```

Impact Execution

For stand-alone batch job submission, the user should execute member IMPACT from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of IMPACT is comprised of the following Natural text members:

```
JCLSTART
JCLIMPX1
JCLIMPX2
JCLLAST
```

Execute Modification for all Objects

For stand-alone batch job submission, the user should execute member MODIFY from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of MODIFY is comprised of the following Natural text members:

```
JCLSTART
JCLREMX1
JCLREMX2
JCLLAST
```

Global Reports

For stand-alone batch job submission, the user should execute member REPORTGL from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of REPORTGL is comprised of the following Natural text members:

```
JCLSTART
JCLREPG1
JCLREPG2
JCLREPCT
JCLLAST
```

Impact Reports

For stand-alone batch job submission, the user should execute member REPORTIM from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of REPORTIM is comprised of the following Natural text members:

```
JCLSTART
JCLREPI1
JCLREPI2
JCLREPCT
JCLLAST
```

Modification Reports

For stand-alone batch job submission, the user should execute member REPORTMO from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of REPORTMO is comprised of the following Natural text members:

```
JCLSTART
JCLREPR1
JCLREPR2
JCLREPCT
JCLLAST
```

2

Natural Engineer Installation Guide

Application Reports

For stand-alone batch job submission, the user should execute member REPORTEN from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of REPORTEN is comprised of the following Natural text members:

```
JCLSTART  
JCLREPA1  
JCLREPA2  
JCLREPECT  
JCLLAST
```

Application Delete

For stand-alone batch job submission, the user should execute member DELAPP from the NEEvrs.JOBS dataset.

For NATRJE, the equivalent of DELAPP is comprised of the following Natural text members:

```
JCLSTART  
JCLDELE1  
JCLDELE2
```

ENVIRONMENT CONSIDERATIONS

Chapter Overview

This chapter describes some of the Environment considerations required for Natural Engineer.

The topics covered are:

1. **Architecture**

Describes the use of Entire Net-Work to run Natural Engineer with an example of running a project.

2. **Environment Sizing**

Describes the environment sizing considerations based on one million lines of source code.

3

Natural Engineer Installation Guide

Architecture

As Natural Engineer is a Natural application it can take advantage of the Software AG Entire Middleware technology within a client-server environment. The Natural Engineer software can operate with the Adabas Repository existing local or remotely with the appropriate technology in place.

Entire Net-Work

The following Figure 3-1 illustrates the client server options.

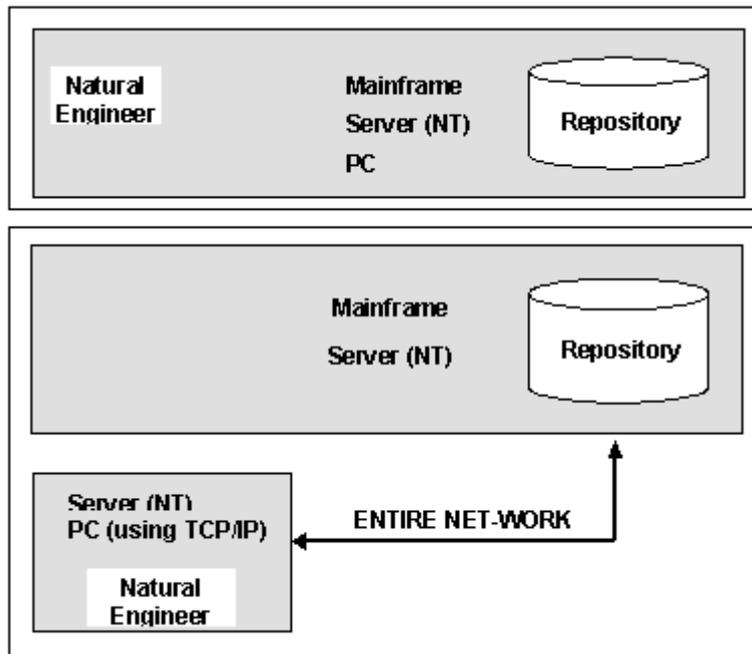


Figure 3-1 Client Server Options

The following Figure 3-2 illustrates the Configuration options.

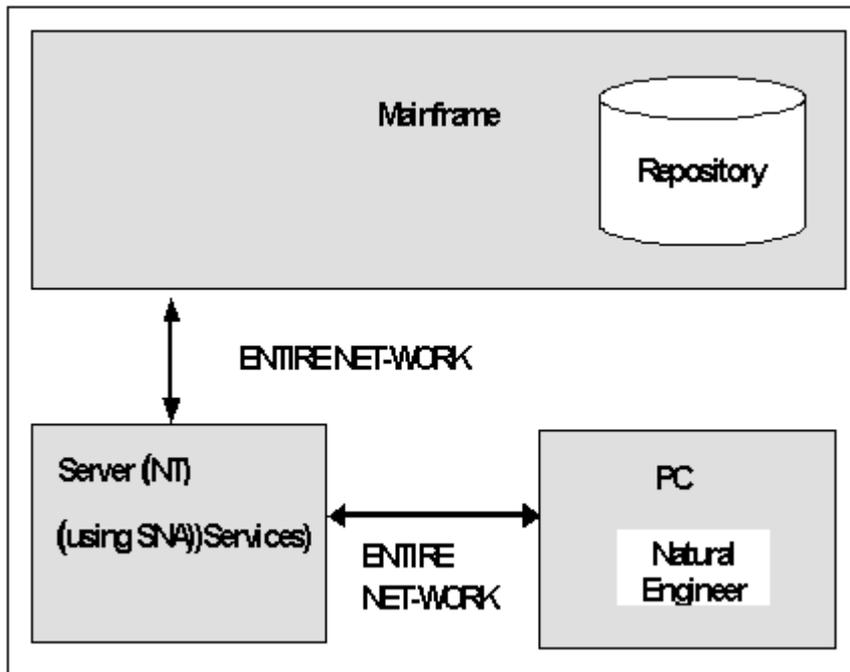


Figure 3-2 Configuration Options

The Natural Engineer application can exist on the same platform as the database as shown above. This can be a mainframe, an NT server or a PC. The database can exist on a mainframe or a server (NT) and the application can exist on a PC. Communication between the platforms is provided by Entire Net-Work. This software must exist on each platform that is being used.

Example of using the Entire Net-Work

The following example illustrates the requirements to setup a project using the PC software. If we assume that there are 5 workstations involved in a project, then the following would be required:

- A Server to contain the Natural Engineer Repository Adabas database, this would be NT running Adabas.

Note: The Adabas NH parameter should be increased dependent on the number of users.

- 5 PC work stations running Natural Studio, if Modification execution can be controlled onto one PC then runtime versions of Natural could be used on the 4 other PCs.
- ENTIRE Net-Work would be required for the NT server that contains the Adabas database.
- Each PC would reference that same Natural FUSER file for access to the application code being impacted.
- A server version of the diagramming tool can be referenced for each PC from the NT server.
- Each PC must have its own copy of the Natural Engineer directory and also the Natural PIC directory so that information is not inadvertently overwritten.

Coordination

Within a project using Natural Engineer there are tasks that must be executed singly and tasks that can be executed in parallel. Listed below are the tasks that fall into each of these categories.

Single Tasks

- Pre-parser execution, this will identify what objects are initially missing from the application library
- Impact Execution (Single PC)
- Modification Execute All

Multiple Tasks

- Extract and Load ranges of objects into the Repository. Using the Load balancing facility of the Pre-Parser, you are provided with the exact application object ranges to utilize all PCs for this process.
- Impact Execution (Impact range on mainframe or multiple PC's against one Repository)
- Modification confirmation of the categories and types for the impacted data items
- Individual Modification Execute if executing development version of Natural Studio

Environment Sizing

This section describes the environment sizing considerations based on one million lines of source code.

Hard Disk Space

Natural Engineer writes an Extract file (“application name”.OUT) which contains the neutral records for loading into the Natural Engineer Repository.

- For the PC platforms, 1 million lines of code require 120 Meg of hard disk space.
- For the MVS platform, 1 million lines of code requires 130 cylinders of disk space. This file can also be written to tape.

Adabas Database

Space Requirements

The main consideration when estimating space requirements for Natural Engineer depends upon the complexity of the code, for example how many include routines are present (LDAs, GDAs, PDAs, COPYCODEs etc). The more include routines, the larger the Repository size.

An average record size is 135 bytes.

For 1 million lines of code and more, this would equate to the following:

	Natural Studio	MVS Mainframe	
	Adabas 2.2.3 on NT	3390	3380
ASSO	220 MB	520 cyls	620 cyls
DATA	250 MB	340 cyls	365 cyls
WORK	50 MB		

Nucleus Parameters

The nucleus parameter settings listed below do not depend on the number of lines of code being processed. However, they reflect the recommended minimum set for any Natural Engineer Repository.

Parameter	Setting	Comment
LQ	30,000	
LP	1,600	
LU	16,000	
LOGGING		Set to blank.
LFP	40,000	
LS	20,000	
TNAA	7200	
TNAE	7200	
TNAX	7200	
NOFLAG		

INDEX

E

- Environment Considerations, 39
 - Architecture, 40
 - Environment Sizing, 44

M

- Mainframe Installation, 13
 - BS2000/OSD Installation Tape, 21
 - Changes in processing for Natural Engineer 4.3.1, 14
 - Customization, 30

- Installation Jobs, 15
- Installation Steps, 23
- Modifying Natural Engineer Jobs, 31
- NEE Processes and Related Jobs, 33
- OS/390 Installation Tape, 17
- Prerequisites, 16
- VSE Installation Tape, 19

P

- PC Installation, 9
 - Installation Prerequisites, 9
 - Installation Process, 10
 - Natural Parameter settings, 11

