



AD FALCON API Manual

Checkpoint and Restart: Elastic Foundation Example

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1 Checkpoint and Restart: Elastic Foundation Example

This tutorial demonstrates FALCON's checkpoint and restart capabilities using the plane strain foundation example from [Option 3 of the Linear Elastic Foundation analysis](#).

For the complete checkpoint/restart reference (all parameters, strategies, troubleshooting), see the [Checkpoint & Restart System](#) documentation.

1.1 Input Files

| File | Description |
|--|--|
| fem_data_checkpoints.txt | Original analysis with checkpoint saving enabled |
| fem_data_restrat.txt | Restart from a previously saved checkpoint |

Both files use the same foundation model as [Option 3](#) — a static elastic analysis with automatic time increment control.

1.2 Checkpoint Configuration

Add the `% CheckpointControl` section to enable periodic saving:

```
% CheckpointControl
ENABLED = ON
OUTPUT_PATH = ./checkpoints/fem_test
SAVE_FREQUENCY = 5
SAVE_AT_STEP_END = ON
SAVE_AT_SUBSTEP = OFF
MAX_CHECKPOINTS = 30
VALIDATE_ON_RESTART = ON
VERBOSE_LOGGING = ON
%%%
```

This configuration saves a checkpoint every 5 sub-steps, keeping up to 30 files. See [CheckpointControl Parameters](#) for details on each option.

1.3 Restart Configuration

To resume from a saved checkpoint, add the `% RestartFrom` section:

```
% RestartFrom
FILE = ./checkpoints/fem_test_step1_sub75.adfalcon
VALIDATE_MESH = ON
%%%
```

See [RestartFrom Parameters](#) for all available options.

Important: The mesh definition (nodes, elements) must be identical between the checkpoint and restart files.

1.4 Workflow

1.4.1 Run Initial Analysis

```
./falcon fem_data_checkpoints.txt
```

Console output shows checkpoint saves:

```
[Checkpoint] Saved: ./checkpoints/fem_test_step1_sub5.adfalcon
[Checkpoint] Saved: ./checkpoints/fem_test_step1_sub10.adfalcon
...
```

1.4.2 Resume After Interruption

If the analysis is interrupted, edit the restart file to point to the latest checkpoint:

```
% RestartFrom
FILE = ./checkpoints/fem_test_step1_sub75.adfalcon
VALIDATE_MESH = ON
%%%
```

Then run:

```
./falcon fem_data_restrat.txt
```

The simulation resumes from sub-step 75, producing identical results to a continuous run.

1.5 Key Sections in Example Files

1.5.1 Initial Run (fem_data_checkpoints.txt)

```
% AnalysisType
PLNonCoupled
%%%

% CheckpointControl
ENABLED = ON
OUTPUT_PATH = ./checkpoints/fem_test
SAVE_FREQUENCY = 5
SAVE_AT_STEP_END = ON
MAX_CHECKPOINTS = 30
%%%

% Step Definitions
@Step 1:
@@StepTime: 1.0
@@ModernAutoInc: Yes
@@SimMode: Static
...
%%%
```

1.5.2 Restart Run (fem_data_restrat.txt)

Same as above, plus:

```
% RestartFrom
FILE = ./checkpoints/fem_test_step1_sub75.adfalcon
VALIDATE_MESH = ON
%%%
```

1.6 See Also

- [Checkpoint & Restart System](#) — Complete reference (parameters, strategies, troubleshooting, file format)
- [Linear Elastic Foundation Example](#) — The base model used here
- [Automatic Increment](#) — Time stepping with ModernAutoInc