# SCS RF

## Terminology

Scot RF exists in two variants- Panel and Truss.

The term **frame** and **truss** are used interchangeably; for example AdjustForJointsU.process**Truss .**

Each frame (or truss) consists of a number of items, variously referred to as items, entities (and in scs design trusslines , TSteelItem , steel members).

Within ScotRF the class names

* TFrame Refers to a panel or truss
* TEntityItem Refers to a steel item that is part of a frame
* TSimpleItem Refers to a steel item that is **not** part of a frame.

Data Structures

## FrameData.pas

* TFrameSelection
* TFrame

The class TFrameSelection

has two primary interfaces

SelectFramesUI For normal operation

SelectNFrames for unit testing

Initial selection reads and decodes a file (.ep2, .txn etc). The data file defines each steel item in terms of four points and 'special operations' eg service holes. This data is stored in each frame in a (dynamic) array of EntityRecType.

AdjustForJointsU.processTruss then creates the manufacturing details for each item. Details of the required operations are passed back in the (static) arrays EntityRecType.

## TProductionQueue .pas

* TProductionQueue
* TItemBase
  + TEntityItem
  + TSimpleItem
* TQOperation

TProductionQueue contains a list of items to manufacture.

The list is built either from the TFrame Selection (TProductionQueue.AddSelectionToQueue) or from a process file (TProductionQueue.ParseProcessStrings).

* The frame items are of sub-type TEntityItem and reference the corresponding frame
* process file items (and the offcut item) are TSimpleItem

**Building the manufacturing Queue**

1. Initially, each item is constructed with a list (FOperations: TObjectList<TQOperation>) required to manufacture **that** item.   
   The operation stores the operation, the actual position records the and 'relative position .  
   The relative position is determined from the actual position and rollformer tool position relative to the cut position .  
    The value is calculated in TToolOffsets.RelativePosition.
2. Where the calculated relative position is negative, the operation is moved to the preceding item. (RelocateOperations)
3. operations are sorted by relative position.

Box Web

The box web items are assembled in a separate queue (FWebQ : TSteelList;)

**Running the manufacturing Queue**

The main queue and box web queue are merged. Where there is no box web, the MergedQ is simply a copy of the MainQ.

The manufacturing process iterates each item in the MergedQ and , for each item iterates the tool operations.

During the iteration, each event triggers a corresponding event handler (in Unit1) which handles the implementation details.

* OnFrameStart
* OnItemStart
* OnMove
* OnToolOp
* OnItemFinish
* OnFrameFinish

## Program structure / Asynchronous signals

Unit1 contains the display and communications code required for the manufacturing process. This is launched from the main screen as a modal dialog. The WM\_STARTQ message triggers the manufacturing which runs in the main thread.

In order to maintain responsiveness, both the machine communications (Unit1) and the processing loop (ManufactureU) embed calls to application.processmessages.

The state of the manufacturing process is indicated via the state variable

Running

In addition the manufacturing process is monitors two semaphores

AsyncPause when set, manufacturing is suspended until the flag is reset or the AsyncAbort flag is set.

AsyncAbort Can be set at any time and will cause manufacturing to terminate with ETerminate exception