FORCAM™ FORCE

Version 5.9

Manual Operation Quantity Splitting

Manual

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1 Introduction

1.1 Use case

Production departments generally operate 24 hours around the clock. However, master production scheduling is often not immediately available in ERP. As a result, it is not always possible to respond to every contingency via master production scheduling in ERP and adjust accordingly. Moreover, rapid changes in ERP may be very complex in certain situations.
FORCAM FORCE™ provides a number of manual ad hoc functions to adapt production dynamically in situations where ERP is unavailable as a master system. One of these functions facilitates splitting operation quantities manually.

⚠ Such scenarios are inherently questionable as they may result in asynchronies between ERP and actual practice which may impact cost balancing. These ad hoc functions may therefore only be used with foresight and due care.

The scenario described below is a general use case for manually splitting operation quantities in a production order in FORCAM FORCE™:

- The production scenario is affected by sudden, dynamic change. Master production scheduling is not available and no dynamic scheduling system is being deployed in FORCAM FORCE™.
- The Foreman decides to manage part of the workflow at another workplace/machine during production. The machine operator has to be able to do this directly in the shop floor terminal (SFT), i.e. independently of ERP and at any time (day and night shift).

1.2 Quantity splitting concept

The target quantity of an operation can be split in FORCAM FORCE™ via the shop floor terminal. In this case, a given operation is separated into two operations and the original target quantity distributed either 50/50 over these two operations, or as desired by means of a manual setting.

Splitting in this way creates a new operation as a copy having the same operation number, but with an incremented split number (see Fig. 1). This new split operation can be rescheduled to another workplace in the process (additional application of the operation rescheduling function) or can remain at the same workplace. The split operation is always in an inactive phase.

Each operation having the same operation number may exist 1-n times with a sequential split number (0-n) at a single workplace or distributed over other workplaces.

Each split operation can iterate corresponding phase changes independently of other (split) operations. This ensures that the correct time totals are calculated for each split operation and then transmitted to the ERP system as the phase changes. An operation is reported to an ERP as FINAL CONFIRMATION when all the operation splits have been completed.

The quantity of any operation which is currently not in progress can be split.
An operation can also be split at the shop floor terminal when it is just being processed.

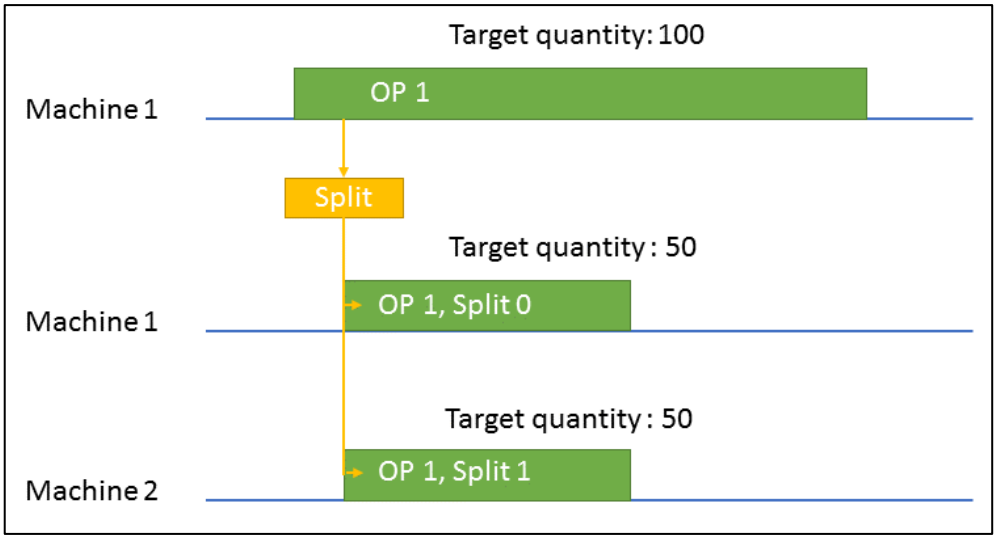

Fig. 1: 50/50 breakdown of target quantity following a manual quantity split

Operations at workplace groups, and even a split itself, can also be split.

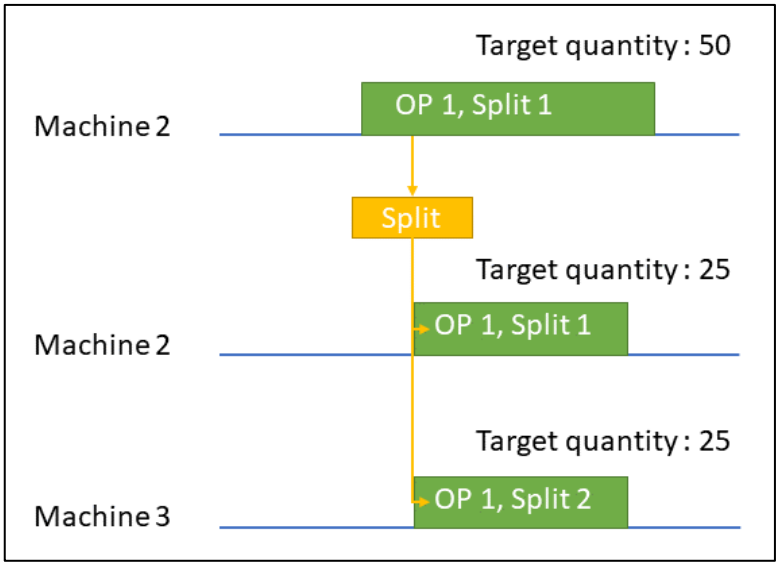

Fig. 2: 50/50 breakdown of the target quantity of a split

2 Manual quantity split in the SFT

The shop floor terminal displays the operations at every workplace. The target quantity indicated represents the individual operation concerned.
An operation can be split via a configured button. The target quantity is broken down as necessary. The split operation remains at the same workplace in this case.

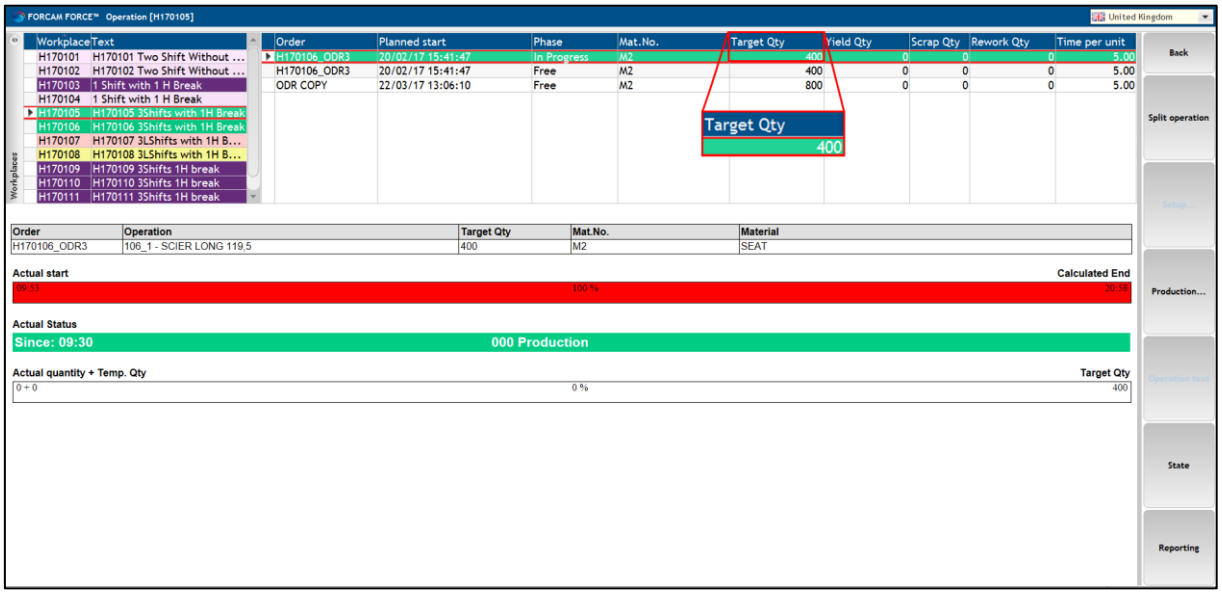

Fig. 3: Target quantity of an operation before the split

The user can split an operation via a configured button. A pop-up dialog indicates the previously selected operation and the associated (original) target quantity.

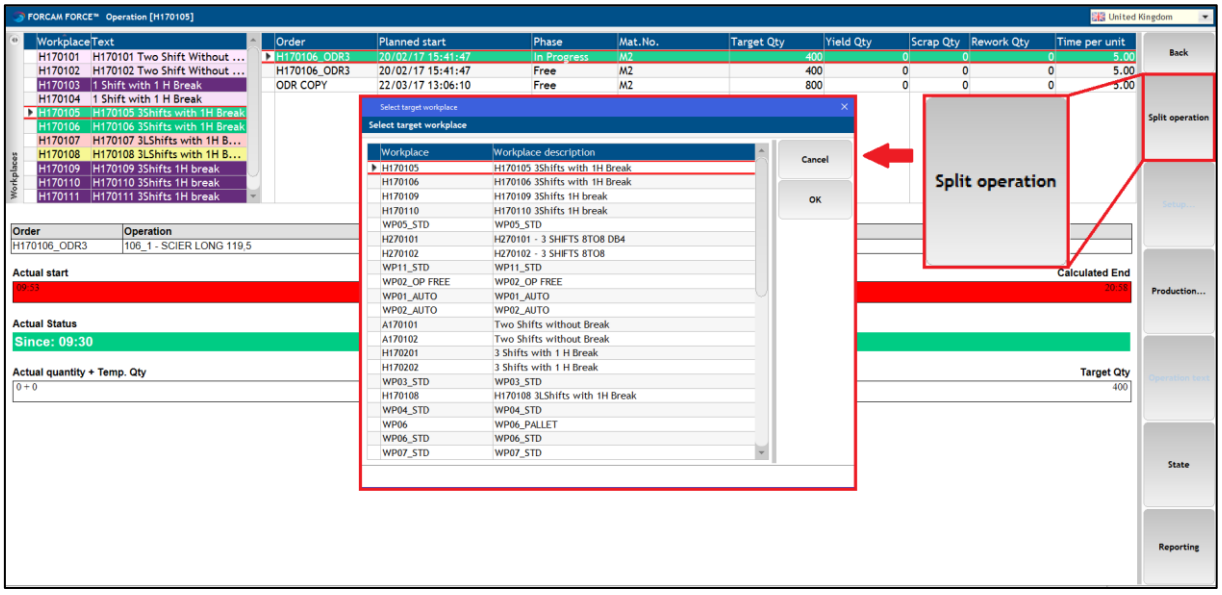

Fig. 4: Splitting an operation via a configured button

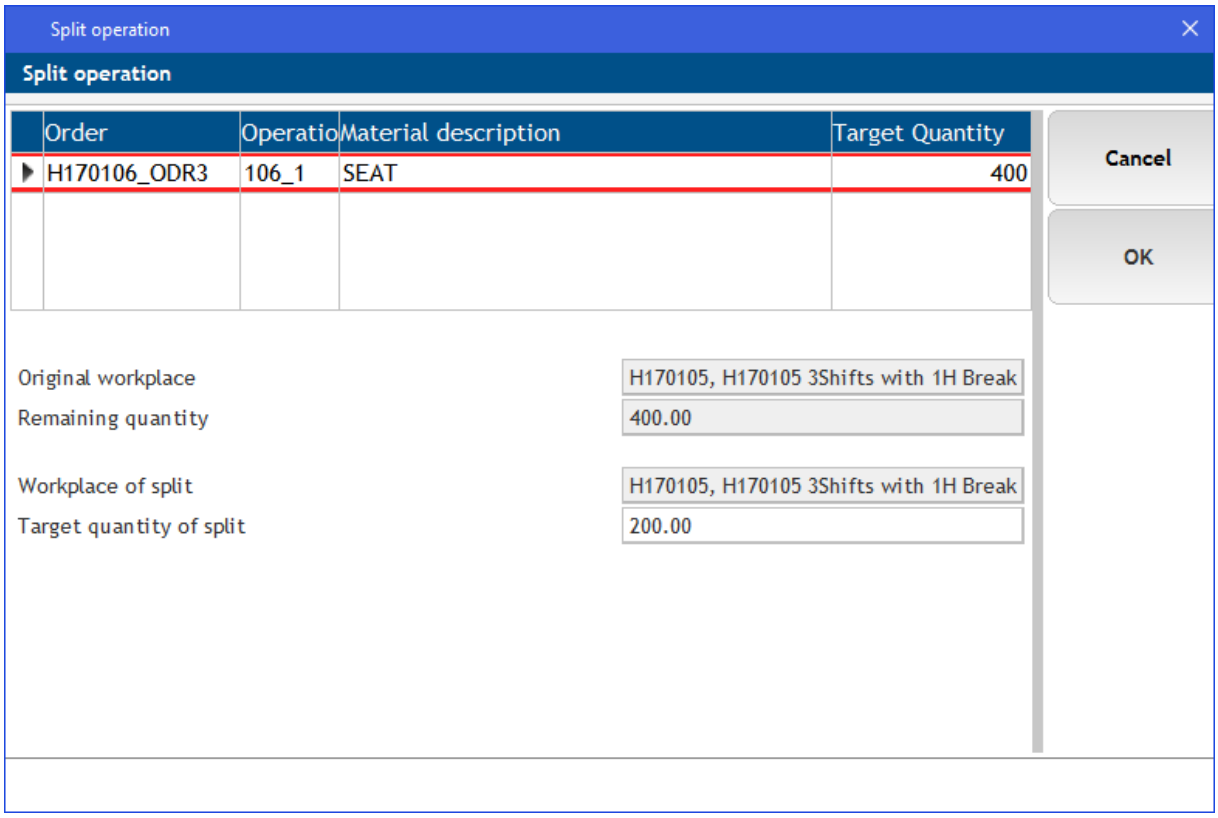

Fig. 5: Dialog to define the new target quantity of the split operation

The **Original workplace** is the workplace at which the operation is currently running or being supplied. No workplace is displayed here if the operation relates to a workplace group.
The **Workplace of split** is the workplace to which the split operation is being transferred. This step splits the quantity at the same workplace by default.

The **Remaining quantity** is the as yet unprocessed quantity of the original operation.
The desired target quantity of the split operation can be defined in the **Target quantity of split** line. A configurable value is predefined by default here (in this case 50% of the original target quantity). The value must be at least 1. The value may not represent the total remaining quantity. The remaining quantity must be at least 1.

ⓘ The target quantity of the original operation is not updated dynamically in this dialog. It may have changed during the period in which the dialog was open. The target quantity is checked on refreshing by clicking **OK**. An error message appears if it has changed in the meantime.
OK is hidden until a valid input is entered at **Target quantity of split**.

The new target quantity defined in the previous dialog is subtracted from the original target quantity on confirming the dialog (and updating the SFT).

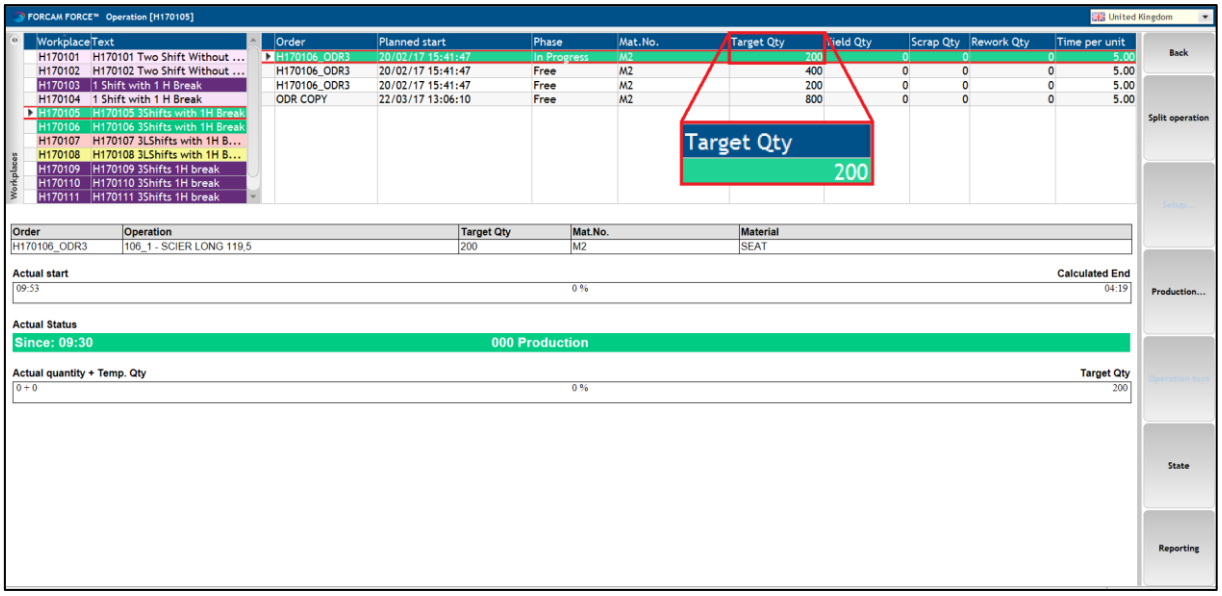

Fig. 6: New target quantity of the operation after splitting

3 Configuration

This chapter describes configuration of the activity step to create a split operation.
Access to the Workbench and familiarity with step configuration are prerequisites.
All designations used here (e.g. for buttons, steps etc.) are for purposes of illustration only and can all be freely defined in principle.

ⓘ Refer to the Shop Floor Terminal manual for details of configuring activity steps.

The activity step required to split an operation is **Create split operation**.

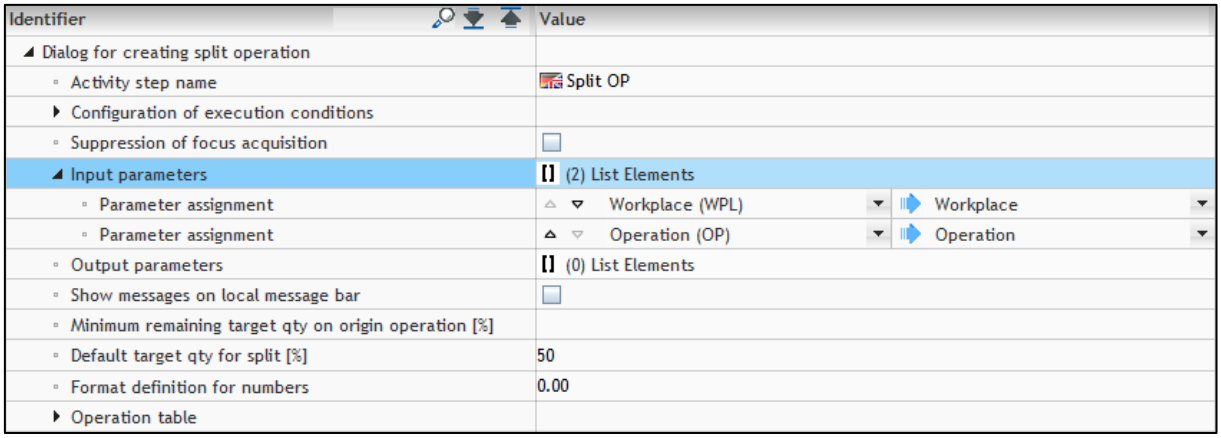

Fig. 7: Configuration of the “Create split operation” step

The workplace selected on the root base page of the SFT and the operation running on it are received in this step. The user can enter a target quantity in the dialog which then serves as the target quantity of the split operation.

The name of the step assigned in the configuration appears in the dialog title. It is recommended to phrase a name meaningful name (in this case: “Split OP”).

The percentage of the original target quantity which is to remain with the original operation is defined in **Minimum remaining target qty on origin operation**. Only the quantity exceeding this value can be transferred to a split operation. The minimum value is 1 by default if no value is entered.
Example:
An operation has a target quantity of 200. Ten (10) is entered at **Minimum remaining target qty on origin operation**. A quantity of 20 must remain with the original operation when splitting and a quantity of 180 can be transferred to a split operation.

The target quantity which is to be suggested/preset based on the original target quantity is defined at **Default target qty for split** (in this case: 50%). A quantity ranging between 1 and the value of the original quantity can be entered regardless of this suggestion. Decimal values are not valid.
The suggested quantity of the target operation is rounded up and the original operation takes the lesser quantity if the original quantity cannot be divided by 2.
Example:
An operation has a target quantity of 11. 50% of this is 5.5. When rounded up, this corresponds to a value of 6 which is duly suggested as the new target quantity for the split operation.

The new target quantity is adopted for this operation on confirming the dialog (and updating the SFT). The current workplace is automatically the target workplace. It is not possible to reschedule the operation to another workplace here.

The activity step requires the following configuration at least:

- Input parameter: **Workplace (WPL) → Workplace (WPL)**
  Operation (OP) → Operations (OP)
- Minimum remaining target qty on origin operation [%]
- Default target quantity for split [%]: **50** (optional)

The columns in the dialog are freely configurable. This dialog in Fig. 5 was configured to display the original order including operation, material description and original target quantity.
The following configuration was used for this dialog:

◢ Column configurations	[] (4) List Elements
◢ Grid column configuration	Order
Column name	Order
Column width	20%
Column visibility	☑
Column attribute	Order No.
Reference to color column	
◢ Grid column configuration	Operation
Column name	Operation
Column width	10%
Column visibility	☑
Column attribute	Operation number
Reference to color column	
◢ Grid column configuration	Material description
Column name	Material description
Column width	50%
Column visibility	☑
Column attribute	Mat.text
Reference to color column	
◢ Grid column configuration	Target quantity
Column name	Target quantity
Column width	15%
Column visibility	☑
Column attribute	Target qty (AVO)
Reference to color column	

Fig. 8: Configuring the dialog to display workplaces

4 Restrictions

4.1 General restrictions

The following restrictions apply to the manual split function at the shop floor terminal:

- Underdelivery tolerances are disregarded.
- Overdelivery tolerances are disregarded in quantity postings of splits.
- Each split is assigned to an explicit workplace – groups are not supported.
  - Target error workplaces of a split must be corrected by rescheduling.
- Splits cannot be reversed, i.e. split operations cannot be recombined with other operations.
- New provisioning of a split from the ERP can overwrite the target quantities and parameters of the operation with split 0 (see Fig. 1).
  - Modifications are not adopted or checked for plausibility in splits which have already been executed.
  - This restriction will be removed and covered by defined rules in ERP download as of release version 5.7.1.
  - The restriction shall remain for capacity groups.
- The manual split function may not be used at the workplaces of a capacity group with the linear auto split function response. A separate SFT template is recommended in this case.
- Interactions/referencing concerning the FMD/DNC/TDM function are disregarded.

4.2 Restrictions on ERP operation downloading

Initial production orders and their data (e.g. operations, production resources and tools etc.) can be stored in ERP at any time by various triggers.
If released and initially supplied data are modified in ERP, the changed data is re-transmitted to FORCAM FORCE™.

The ERP, as the master system, basically owns the data. However, as soon as a manual quantity split (with or without rescheduling) is made deliberately to an operation in FORCAM FORCE™ the original ERP workplace is written and the total target quantity updated in case of change provisioning on split 0 of the operation. This effectively reverses any rescheduling made and the quantity splits result in a discrepancy in the target quantity of the operation.

The response of the system is regulated to resolve this state despite ERP being the master system. The conscious decision and change made by the user in FORCAM FORCE™ must not be overwritten.

Restrictions on ERP downloading:

- On splitting the quantity at the same or a new target workplace (independently of ERP), a change of target quantity is not accepted and updating no longer takes place (targetWorkplaceErp, targetWorkplaceGroup, targetWorkplace, targetQuantity) in case of change provisioning from ERP.
  All the other data of the operation are adopted and updated by change provisioning.

5 Annex

5.1 Abbreviations and Terms

Table 1: Abbreviations and terminology used

Abbreviation/term	Description
Button	Button in the shop floor terminal which trips an activity step
DNC	Direct Numerical Control (NC machines which are connected to a computer)
OP	Operation
Overdelivery	Excess supply compared with purchase order quantity / target quantity
PDM	Production Data Management
SFT	Shop Floor Terminal (the central source of information for production personnel serving as an operating state acquisition unit)
Split	Division (in this context: the target quantity of an operation)
TDM	Tool Data Management
Underdelivery	Short supply compared with purchase order quantity / target quantity

5.2 Table of Figures