Constraint Technologies

# TPAC Pairing

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**TPAC™ Pairing** is part of the TPAC™ suite of crew planning tools. It automatically creates a set of optimised crew pairings for schedules that are too large for manual pairing creation. It ensures that the crew pairings have a minimised cost subject to the constraints given by the crew work rules and the desire for a solution that is robust and less vulnerable to disruptions.

## How is TPAC Pairing used?

**TPAC™ Pairing** has been designed to handle all pairing requirements for a transport enterprise including:

- Planning.
- Just in Time Crew Assignment.
- Repair of disrupted Pairings.
- The user can change rules (legal or otherwise) to produce an experimental "what if" solution such that it can be compared to the current set of rules.
- Penalties are set by the user, enabling them to choose the trade off between various rules. Examples where penelties apply:

  1. Pairings that are not robust
  2. Solutions that are inequitable between bases
  3. Pairings that are legal but undesirable from the perspective of the crew

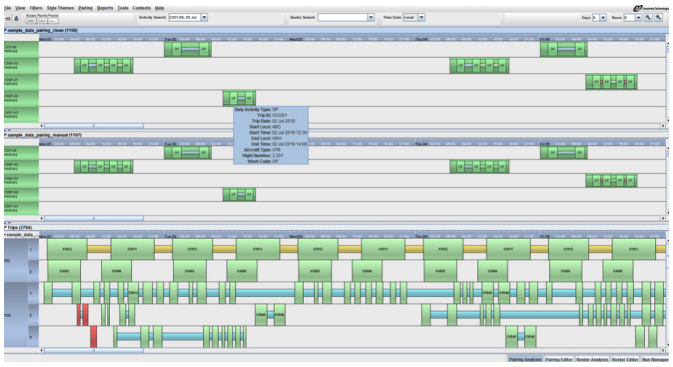

Fig.1 *The user interface TPAC™ Workbench allows the user to load multiple pairing solutions together so that the user can directly compare between the different solutions.*

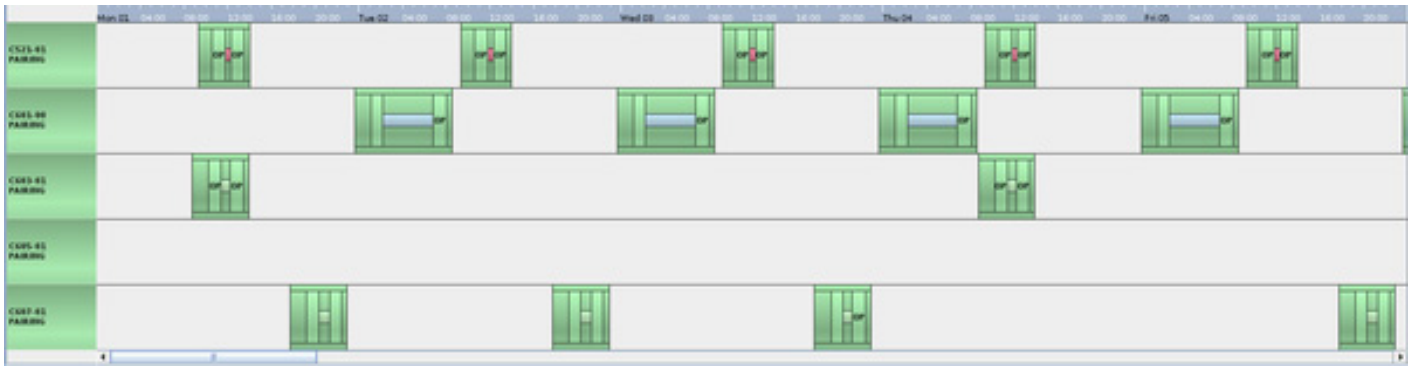

Fig. 2 *A view of the vehicle schedule and some of the pairings built to crew it.*

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## Advantages of TPAC Pairing

The **TPAC™ Pairing** Optimiser has the following advantages

**Produces robust patterns through:**

- Minimisation of vehicle changes.
- Penalties for tight connections.
- Penalties for duty time or operating time close to legal maximums.
- Minimisation of number of pairings if variable crewing is required on each leg.

**Flexibility:**

- Optimisers can generate an entire solution, improve existing solutions or repair solutions after schedule changes.
- Extraction and optimisation of weekly and daily schedules is available to improve solution regularity.
- Users can direct the optimisers using additional constraints if desired.
- Support of ground travel from base to alternate ports/stations or between nearby ports/stations.
- Support of international time zones and currencies.

Our optimisers are suitable for large problems that are made up of thousands of staff.

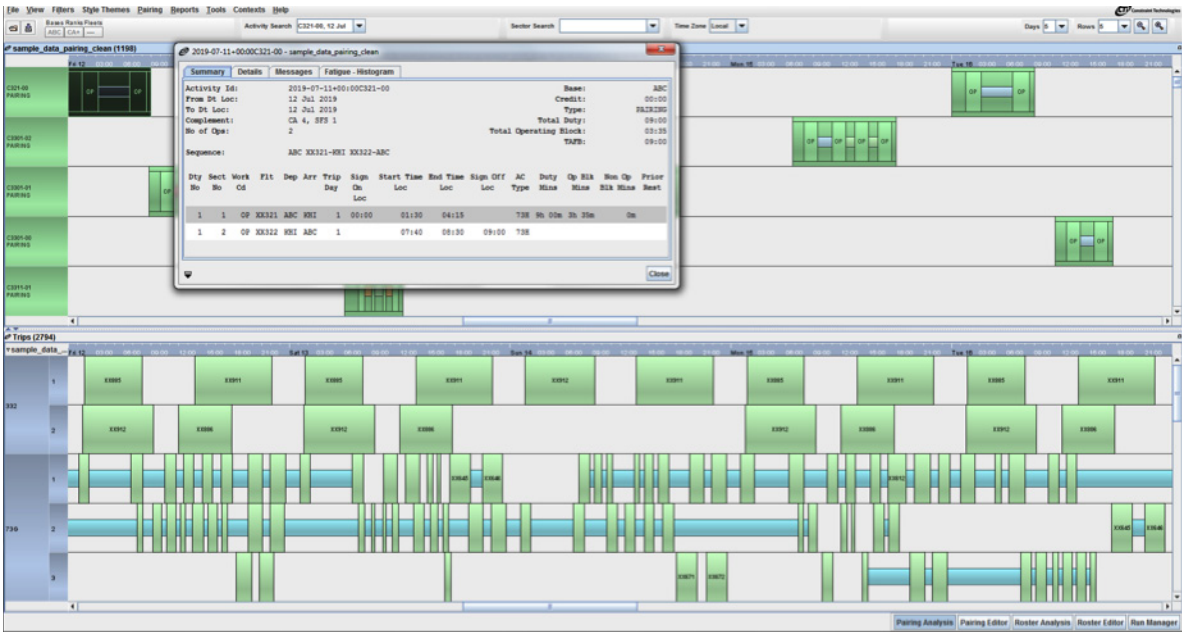

Fig.3 *A set of pairings*