

## **TPAC** Rostering





TPAC Rostering



**TPAC<sup>™</sup> Rostering** is part of the TPAC<sup>™</sup> suite of crew planning tools. Its objective is to create legal, workable rosters that cover all of the work to be done at minimum cost. **TPAC<sup>™</sup> Rostering** is very flexible and deals with complex business rules, safe working requirements (including fatigue), workplace agreements and technical requirements.

## How is TPAC Rostering used?

**TPAC<sup>™</sup> Rostering** has been designed to handle all rostering requirements for a transport enterprise including:

- Crew pairing allocation
- Leave allocation
- Training allocation
- Standby/reserve duty allocation
- Day off allocation

Allocation can follow strict precedence, or use fair share algorithms to allocate a (weighted) fair share of activities. To support this, **TPAC™ Rostering** incorporates a number of solvers:

- Construction Solver: designed for speed and coverage. This solver is typically used to ensure that basic rostering requirements such as stand-by and leave levels are met.
- Sequential Solver: allocates activities to crew in a strict sequential order. This solver is typically used in a situation where staff bid for activities, and strict rules govern priority when awarding bids.
- Preferential Fair Share Solver: allocates activities so as to maintain a fair share of work between crew. The definition of "fair" is configurable, and can incorporate elements such as staff seniority and crew preferences.
- Recency Solver: ensures that expiring staff skills are renewed through the allocation of standard activities or special training.

Each optimisation run incorporates a pipeline of any arrangement of these solvers, with selectable rules for each pass. Manual roster allocations and deallocations may be performed at any stage to cater for special requirements.

The user can change rules (legal or otherwise) to produce an experimental "what if" solution that can be compared to the current set of rules.

## Advantages of TPAC Rostering

The TPAC<sup>™</sup> Rostering Optimiser has the following advantages:

- Rules and objectives are dealt with simultaneously providing the lowest cost "legal" roster.
- Work can be fairly distributed both on the day and averaged over time.
- Non-productive activities can be scheduled to minimise impact and cost.

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

Staff	Solution		08:00			08:00	16:00		08:00		Thu 04			Fri 05	08:00	16:00			16:00
90131 Yhhazgudvd CA	74h50m 141h50m	0FF 00:00	OFF ABC-ABC	0h 0h 23:59			3h15m 6h05m 17:45		AS AS			3h05m 5h55m 08:45			PAIRING C683-0 09:05		0FF 00:00	OFF ABC-ABC	0h 0h 23:59
90132 UWJEIJOGA CA	19h30m 138h25m	0FF 00:00	OFF ABC-ABC	0h 0h 23:59				PAIRING <b>C305-00</b> 23:50			0FF 00:00	OFF ABC-ABC	0h 0h 23:59		SEP330 SEP330 08:30			SEP330 SEP330 08:30	
90133 LGGXXZHCMJ CA	64h30m 97h25m	PAIRING6h C875-00 23:25			3h15 6h05 03:35	m		0FF 00:00	OFF ABC-ABC	0 0 23:5	•		3h15r 6h05r 19:15	17			PAIRING C811-01 23:1008:45		
90537 Dojfyrbegcecf CA	VNL 147h59m	PAIRING C811-00 23:1008:49	5				AIRING C867-00 14:00 00:00	0FF 00:00	OFF ABC-ABC	0 0 23:5	1	OFF ABC-ABC	0h 0h 23:59			PAIRING <b>C645-00</b> 15:55			
90538 SMQXGVIFBVWM CA	79h55m 136h30m	79h55m 136h30m	SEP330 SEP330 08:30			SVC0h SVC 08:00			HS1 HS1 07:00		0FF 00:00	OFF ABC-ABC	0h 0h 23:59	0FF 00:00	OFF ABC-ABC	0h 0h 23:59			AIRING <b>C515-00</b> 3:55 00:10
90230 XPEWWL CA	79h30m 133h05m	PAIRING		C885-00 ABC-BKK-A		15h4	12h 15m 1:15			17:45			C667-00	0FF 00:00	OFF ABC-ABC	0h 0h	OFF	OFF ABC-ABC	0h 0h 23:59
90539 TWYBCPQG CA	30h20m 46h25m	A/L 00:00	A/L ABC-ABC	0h 0h 23:59		A/L ABC-ABC	Oh	A/L 00:00	A/L ABC-ABC	0	h A/L h 9 00:00	A/L ABC-ABC	0h 0h 23:59	A/L 00:00	A/L ABC-ABC	Oh	A/L 00:00	A/L ABC-ABC	0h 0h 23:59
90231 KHIWGYM CA	83h35m 136h27m	PAIRING 23:45		C885-00 ABC-BKK-A		15h4	12h 45m 8:15		PAIRING <b>C653</b> - 08:50	<b>00</b> 20:15	0FF 00:00	OFF ABC-ABC	0h 0h 23:59				Oh		3h15m 6h05m 18:00

Fig.1 A view of crew rosters in TPAC<sup>TM</sup> Workbench, with crew allocations displayed according to the activity's start/end times.





Staff S	olutio	n Mon 01		00 Tue 02			Wed 03		:00 T	hu 04		00 F	ri 05		.00 S,	at 06		S	un 07		00 Mon 0	8 08:00 1	.e.00	Tue 09		00 W	/ed 10 0		
0131 HHAZGUDVD	74h50r 141h50	n OFF	OFF ABC-ABC	0h PAIRIN 23:59 17:45	G C517-00 ABC-SLL-ABC	3h15m 23:50		AS3 ABC-ABC	0h F		C663-00	3h05m		C603-00 ABC-IED-ABC	6h30m 0		OFF ABC-ABC	0h C	0FF	OFF ABC ABC	0h PAIRIA 23:59 17:45	C607-01	2h10m		C835-0 ABC-HYD		6h35m	AS2 AS2 23:30 ABC4	
0132 WJEIJOGA	19h30r 138h25	OFF	OFF	0h PAIRIN		CSO	5-00	100400	5h25m 0	DFF	OFF	Oh	SEP330	SEP330	Oh S	SEP330	SEP330		SEP330	SEP330	Oh SEP33	30 SEP330	Oh	SEP330	SEP330	0h	DFF	OFF	01
0133 3GXXZHCMI	64h30r 97h25r	n 5-00	ABC-ABC	23:59 23:50 6h PAIRIN	G C901-03	ABC-B 3h15m	OM-ABC OFF	OFF	08:30 ( 0h F	AIRING	ABC-ABC	23:59 3h15m	PAIRIN	ABC-ABC 3	15:30 0 C811		ABC-ABC	15:30 0 6h35m P		ABC-ABC	15:30 08:30	ABC-ABC	15:30	08:30	ABC-ABC	15:30 16h		BC-ABC	23:5
0537		N-ABC		08:25 03:35 6h35m PAIRIN		09:40 7h05m		ABC-ABC	23:59 1 0h 0		ABC-SLL-ABC		23:10 PAIRING		ABC-BL 4h25m P			08:45 1			7h35m PAIRIN	ABC-LHR-ABC	3h15m	AS5		09:45 0h	DO:00 A	BC-ABC	23:5
OJFYRBEGCECFV	NL 147h59	LR-ABC	_	08:45 14:00	C867-00 ABC-LK0-ABC	00:00	00:00	OFF ABC-ABC	23:59 (		OFF ABC-ABC	23:59		C645-00 ABC-KWI-ABC	23:40 2			C055- ABC-MAA	A-ABC		09:40 18:00	C657-02 ABC-DOH-AB	C 00:05	18:00	AS5 ABC-ABC	21:30			CS ABC
0538 IQXGVIFBVWM	79h55r 136h30	n SEP33	SEP330 ABC-ABC	0h SVC	SVC ABC-ABC		HS1 07:00	HS1 ABC-ABC	0h 0	DFF	OFF ABC-ABC	0h 23:59		OFF ABC-ABC	0h P		C515-00	5h35m F		CS67-00	7h05m 0FF	OFF	0h	OFF	OFF ABC-ABC	0h /			
EWWL	79h30r 133h05		C885-00 ABC-BKK-ABC	19.901 00.00	ADEMDE		PAIRING	C607-03 ABC-DXB-ABC	2h20m F			4h35m		OFF ABC-ABC	0h 0		OFF ABC-ABC		PAIRING	C657-02	3h15m HS2	HS2 ABC-A		0h 06:30	C657-02		нѕз	HS3 BC-ABC	21:0
9539 YBCPQG	30h20r 46h25r	A/L	A/L ABC-ABC	0h A/L 23:59 00:00	A/L ABC-ABC		A/L 00:00	A/L ABC-ABC	0h /		A/L ABC-ABC	0h . 23:59		A/L ABC-ABC	0h A		A/L ABC-ABC	0h A		A/L ABC-ABC	0h A/L 23:59 00:00	A/L ABC-ABC	0h 23:59		A/L ABC-ABC	0h /		A/L BC-ABC	22.5
D231 IWGYM	83h35r 136h27		CSS5-00 ABC-BKK-ABC		AND MOL	12h	PAIRING		6h25m 0	DFF	OFF ABC-ABC	0h .	AS2	AS2 ABC-ABC		PAIRING		3h15m A		AS3 ABC-ABC	0h PAIRIN 16:30 07:45	(G C857-01	7h35m		OFF ABC-ABC	0h 1	DFF	OFF BC-ABC	23.5
0130 ZGLJOGM	83h55r 136h55	n im		7h40m PAIRIN	G C505-01		PAIRING	C667-00	4h35m 0	DFF	OFF ABC-ABC		PAIRING		C875-I			6h P	PAIRING		C657-82 ABC-D0H-ABC		3h15m 00:05			3h15m	HS 1	HS1 BC-ABC	0
D541 TDWUQNCK	88h55r 141h57	m	6h AS2	ASZ			PAIRING	C663-00	3h05m 0	DFF	OFF	Oh	PAIRING	C835-	01	6h35m	AS	2 <sup>0h</sup>	PAIRING	C645-00	4h25m PAIRIN	C681-00	6h30m	PAIRING	-DC-DELMBC	C827	-01		7615
			25 22.20																			APC IED APA							

Fig.2 A view of crew rosters in TPAC™ Workbench, with crew allocations displayed in "full day" format.



Fig.1 Comparing multiple roster solutions in TPAC™ Workbench, with a user-configured theme.