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# **Benefits of Integrating a Crew Resource Planning Perspective into Schedule Design**

**AGIFORS Strategy & Schedule Study Group**

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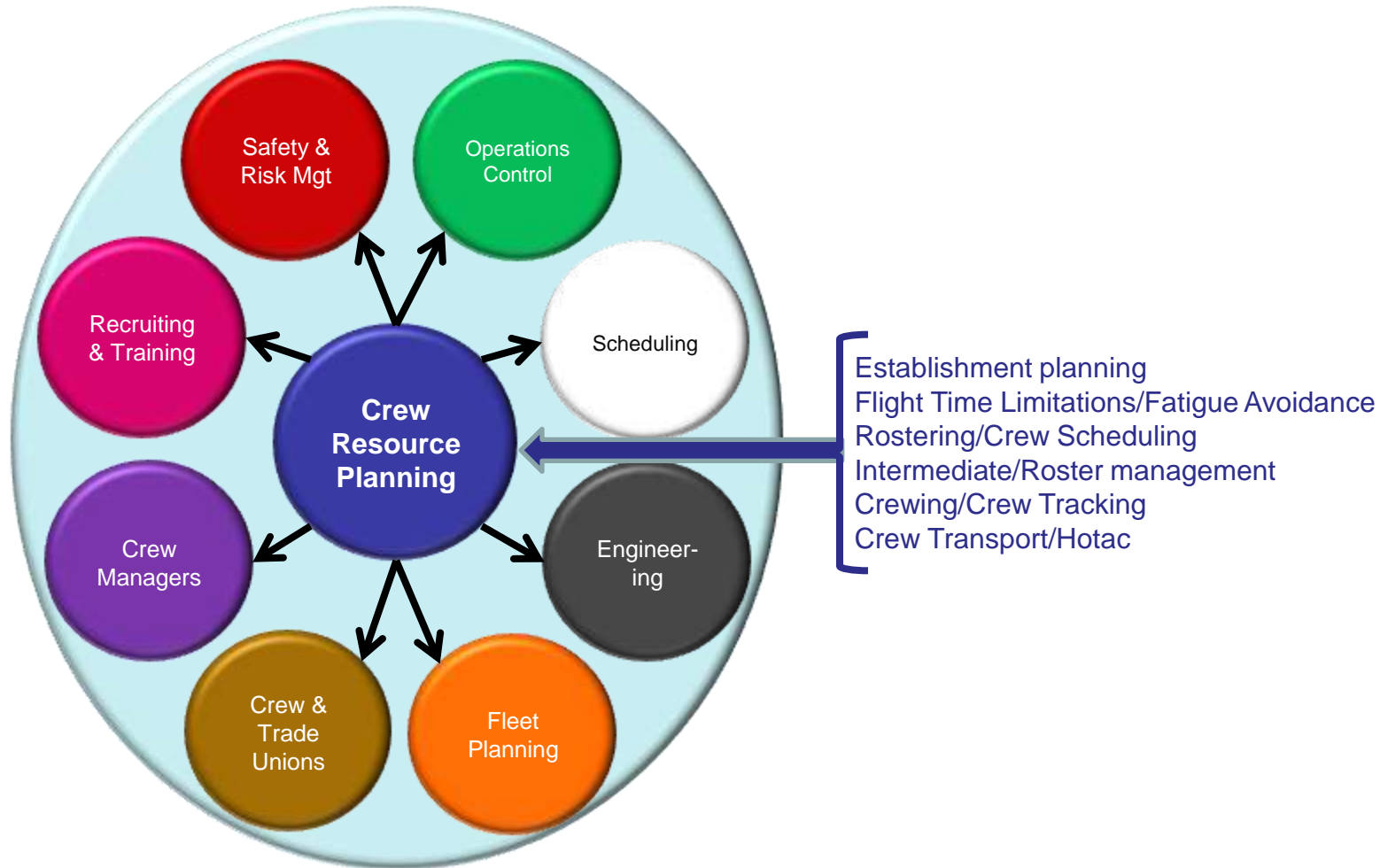
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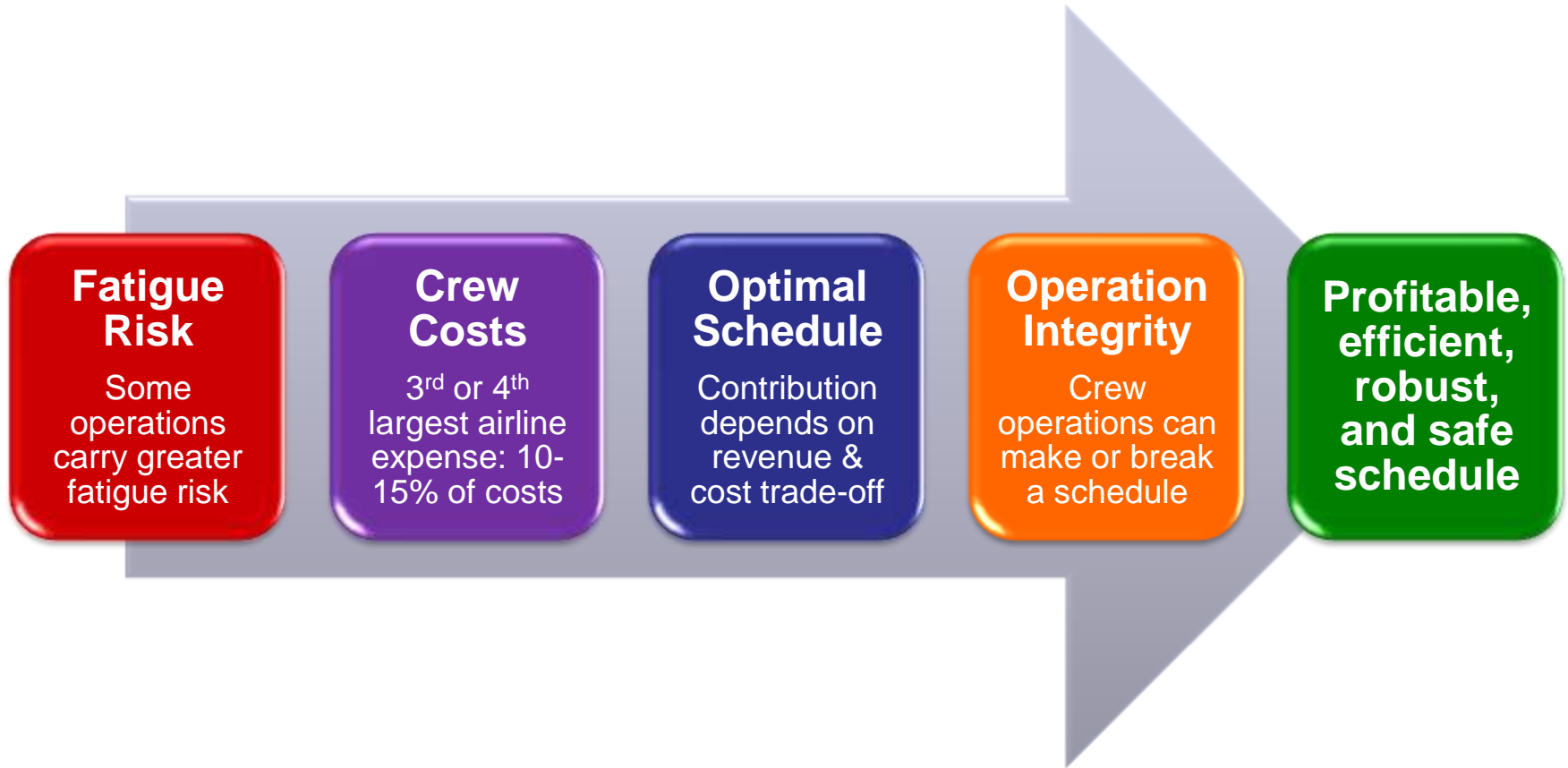
# Airlines maximise value creation by balancing stakeholder interests through the schedule



# Crew resource planning is at the heart of an airline even if it's just one of the schedule drivers



# Why is a crew resource perspective important?



# Case studies

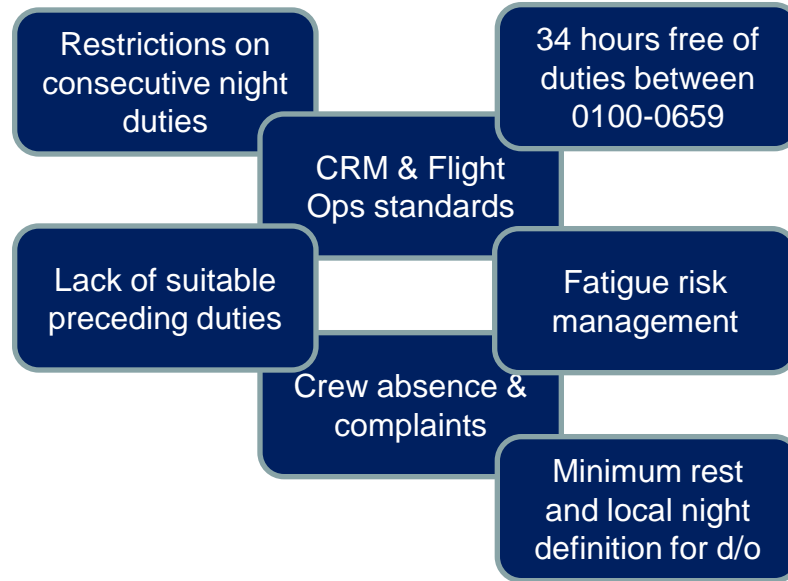
**Note: these case studies are adapted from real events and details have been changed in order to protect the identity of the carriers concerned**

# Case Study 1: Overnight flying & UK FTL

## The Challenge

- ✦ Daily overnight rotation from UK to Mediterranean destination
- ✦ Driven by desire to maximise aircraft utilisation and offer choice of flight timings on route
- ✦ Requires a 9.5 hour flight duty period starting at around 2200L
- ✦ Crew rostered in fixed pattern with 6-day work blocks
- ✦ Requires extra evening standby cover
- ✦ Duty has raised some fatigue concerns

# Case Study 1: Overnight flying & UK FTL



## Overnight

STD 2300  
STA 0730

1 duty to operate  
+

1 rest day  
+

1 sby duty  
=

3 duties  
=

5.0 crews

## Daytime

STD 0800  
STA 1630

1 duty to operate  
=

1.7 crews

D/O	Night	Night	Night	Night	Night	Rest	D/O
D/O	Night	Night	Night	Rest	AM	AM	D/O
D/O	PM	PM	Night	Night	Night	Rest	D/O
D/O	AM	AM	PM	Night	Night	Rest	D/O
D/O	AM	AM	PM	PM	Night	Rest	D/O



← Difference = 3.3 crews →

# Case Study 1: Overnight flying & UK FTL

## The Outcome

- ✦ Increment of 3.3 crews compared with daytime operating cost for the same route
- ✦ Total of 5 crews employed for this one night-time rotation – the same as three daytime rotations
- ✦ Flight contribution was insufficient to make up the additional cost when fully allocated to the route
- ✦ Rotation withdrawn from the following season onwards

# Case Study 2: New two-aircraft base

## The Challenge

- ✦ Airline with fixed roster pattern planning to open a new 2 a/c base
- ✦ Base unlikely to grow further for the foreseeable future
- ✦ Base requires dedicated standby cover as geographically distant from other bases
- ✦ Crew rostered according to a 16-day fixed pattern

# Case Study 2: New two-aircraft base

Day =>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Crew #1	E	E	E	E	E				L	L	L	L	L			
Crew #2		E	E	E	E	E				L	L	L	L	L		
Crew #3			E	E	E	E	E				L	L	L	L	L	
Crew #4				E	E	E	E	E				L	L	L	L	L
Crew #5	L				E	E	E	E	E				L	L	L	L
Crew #6	L	L				E	E	E	E	E				L	L	L
Crew #7	L	L	L				E	E	E	E	E				L	L
Crew #8	L	L	L	L				E	E	E	E	E				L
Crew #9	L	L	L	L	L				E	E	E	E	E			
Crew #10		L	L	L	L	L				E	E	E	E	E		
Crew #11			L	L	L	L	L				E	E	E	E	E	
Crew #12				L	L	L	L	L				E	E	E	E	E
Crew #13	E				L	L	L	L	L				E	E	E	E

Total Early	2	2	3	4	5	5	5	5	5	5	5	5	5	4	3	2
Total Late	5	5	5	5	5	4	3	2	2	2	3	4	5	5	5	5
Total Crew	7	7	8	9	10	9	8	7	7	7	8	9	10	9	8	7

Early Needed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Late Needed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Total Needed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

# Case Study 2: New two-aircraft base

## The Outcome

- ✦ No of crews required per aircraft higher than other bases as standby cover requires significant relative uplift
  - Requires extra 3 pilots and 6 cabin crew relative to another base
- ✦ Fixed pattern peaks and troughs of crew availability are likely to impact operational robustness
- ✦ Recommended more flexible roster and/or faster base growth to generate economies of scale
- ✦ Airline looked to introduce additional flexibility into the fixed pattern

# Case Study 3: Long-haul route profitability

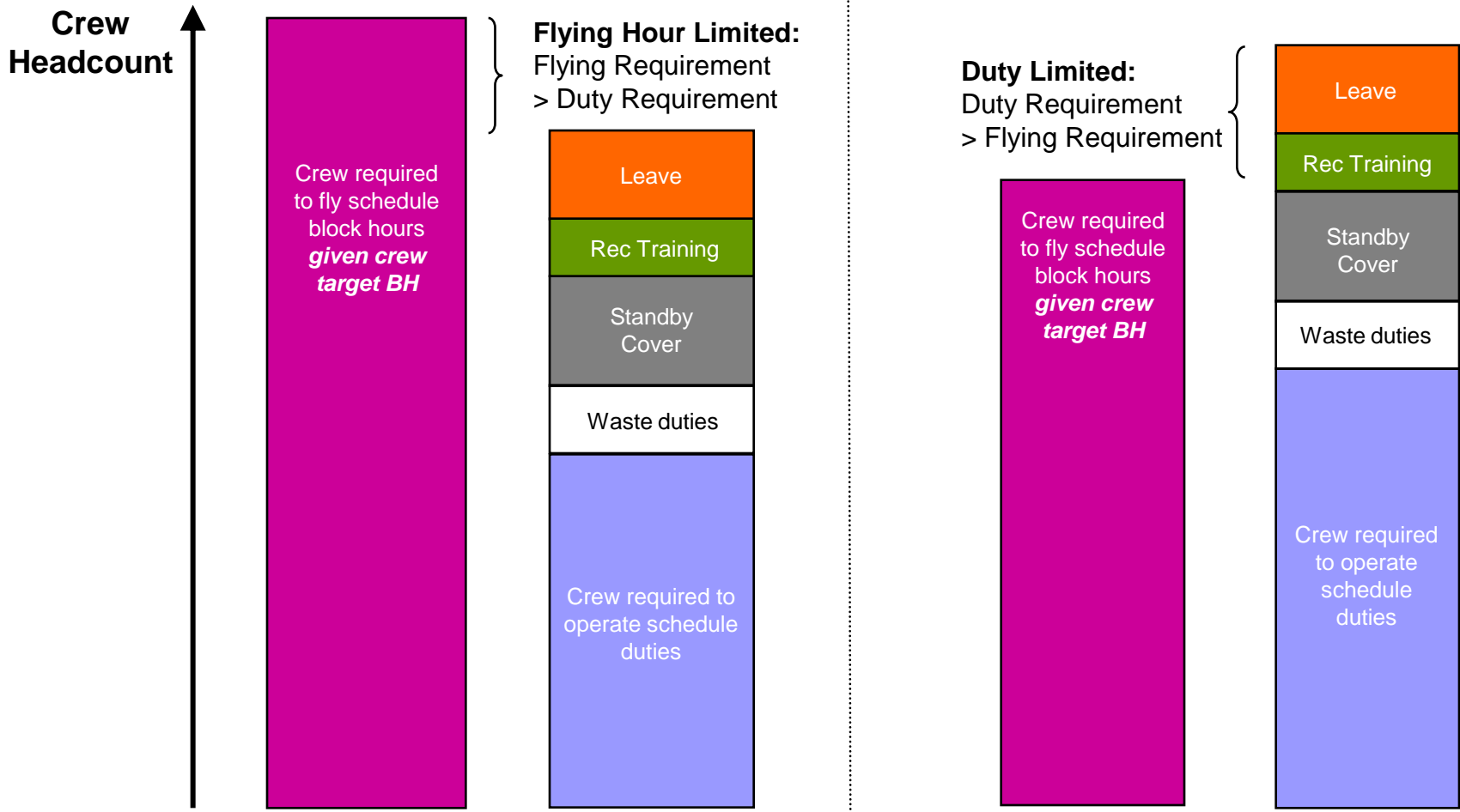
## The Challenge

- ✦ Long-haul rotation from Europe to Asia requiring 9 duty days due to weekly frequency
- ✦ Route profitability calculations based on a flying hour allocation of crew costs, however duties are the relevant crew headcount driver

## The Outcome

- ✦ Crew costs reallocated on a duty basis
- ✦ Route contribution fell by 30%, while route PBT became negative
- ✦ Frequency and viability of route reassessed

# Remember to use the right crew cost driver!



# Guidelines for crew-efficient scheduling

**Note: These guidelines are based on my experience in the European low cost sector, although many can be extended to other types of operation and different geographies**

# Typical crew resource planning objectives

## ✦ Safety

- Minimise fatigue risk
- Minimise use of crew discretion

## ✦ Low Cost

- High, balanced annual flying hours
- Low number of crews per aircraft
- Minimal crew positioning and associated costs

## ✦ Operational Integrity

- Few crew delays
- Standby cover

## ✦ Crew Lifestyle

- High roster stability
- Low crew attrition

# Lead time guidelines

- ✦ It takes 6-9 months to recruit and train a line pilot
- ✦ It takes at least 3 months to recruit and train cabin crew
- ✦ Shorter lead times result in more costly and less reliable solutions
  - Contract pilots
  - Temporary crew basing
  - Positioning crews to operate
  - Making do without standby cover
- ✦ For downsizing or closing a base, 12-18 months notice is required
- ✦ *Network developments and schedules should provide sufficient notice of new bases, lines of flying, or type changes*

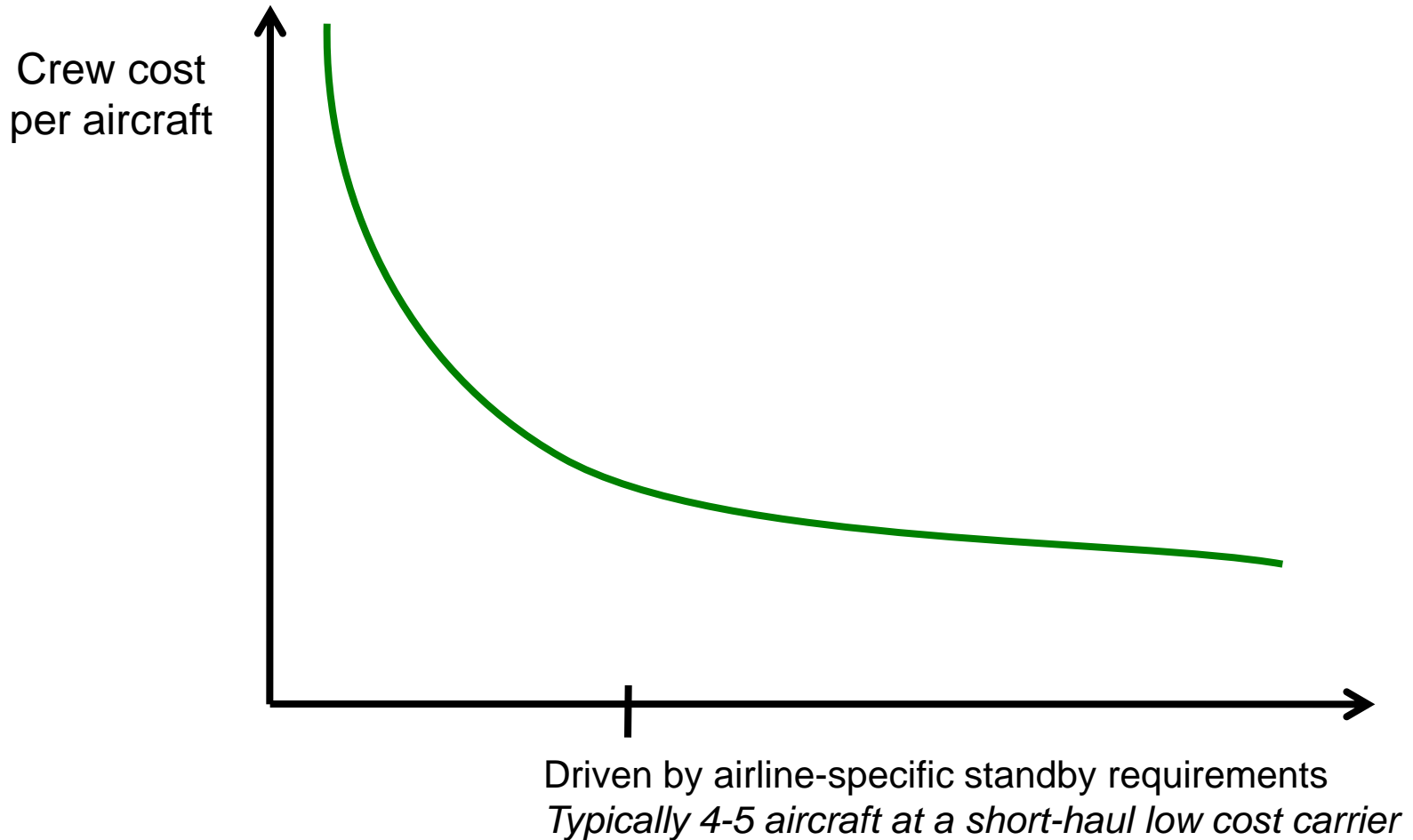
# Crew guidelines for crew base choice

- ⚡ No curfew
- ⚡ Limited seasonal change in flying requirements
- ⚡ Minimal slot constraints
- ⚡ Ready availability of local crew – particularly senior ranks
- ⚡ Ability to pool crew and provide temporary cover from other bases

# Crew guidelines for aircraft basing

- ⚡ Aircraft base = crew base
- ⚡ Originating/terminating aircraft with no overnight stops or split duties
- ⚡ Minimum 4 aircraft – ideally > 10 a/c
- ⚡ Single aircraft type (remaining stable over time)
- ⚡ Joint cabin and flight crew base
- ⚡ Permanent rather than temporary bases

# Minimum efficient scale for crew costs



# Crew guidelines for schedule design

- ⚡ Aircraft start & finish at base and touch base at middle of day
- ⚡ No overnight flying
- ⚡ Fine-tune first STD / last STA to minimise infringement of days off
- ⚡ Allow FDP buffers vs maximum permissible
- ⚡ Aircraft perform 4, 6 or 8 sector days – avoid six-sector crew duties
- ⚡ No W-patterns
- ⚡ Minimal daily or seasonal variations
- ⚡ Duties that can be rostered consecutively

## In summary...

- ✦ Crew are an important consideration for schedule developers
- ✦ Crew economics, fatigue risk management and operational factors can significantly affect route and base profitability
- ✦ Some simple guidelines can be followed to make better schedule decisions from a crew resource planning perspective

### Key Recommendations

- ✦ Ongoing dialogue with those responsible for crew resource planning
- ✦ Simple spreadsheet crew economics model for decision support
- ✦ Remember the binding constraint and use the right cost drivers

## EasyJet cuts flights after new crew roster goes wrong

*The Guardian, 10 August 2002*

EasyJet is to scale back its daily timetable due to the disastrous introduction of a new staff roster, which has damaged morale and left crew languishing in the wrong airports across Europe. [...]

## Low cost airline cancels flights

*BBC News, 5 August 2006*

A budget airline is cancelling 29 flights from Newcastle this month because of a lack of trained staff. [...]

## 30° hottest day of the year.. then rain

*Sunday Mirror, Jun 22, 2003*

[...] However, there was a scare over holidaymakers returning to Britain yesterday. Belgian fighter planes were scrambled when air traffic controllers lost radio contact with a British holiday jet - because the crew tuned to the wrong frequency.

More than 130 passengers were on the easyJet flight from Athens to Luton Airport. The fighters were recalled when the easyJet crew realised their error. An airline spokeswoman said: "*There was a bit of miscommunication*".