RUNWAY STATUS LIGHTS

Report on Eurocontrol Workshop - CDG 29 Apr 2009

FAA Operational Evaluation of RWSL

- Objective was to reduce frequency and severity of runway incursions and prevent accidents (not to <u>prevent</u> incursions).
- At the DFW test site, incursions reduced by 70% over equivalent periods (29 months) – from 10 to 3. Query what definition they are using?
- Several components, but the ones selected for trail at CDG are Take-Off hold Lights (THL) and Runway Entrance Lights (REL). These are both entirely separate from any previously existing standard ICAO lighting equipment.

Take-off Hold Lights (THL)

- Inset lights separate to TDZ, SALS, running along the centreline for 600m.
- Timed to allow for anticipated ATC separation (mixed mode) to avoid nuisance alarms.
- Fully automated with advanced surveillance, only operates when aircraft in motion on runway or approach. Approach is 'occupied' at <u>distance</u> of 0.75nm.
- Red lights mean do not enter. No lights will not indicate safe to enter.
- Lights off/green/white does not mean that you have a clearance! Not like a traffic light system. Only indicated RUNWAY STATUS (ie occupied or not).
- ATC must not issue a clearance when lights are red.
- Use of ICAO stopbars give a different message, especially when used H24.

Runway Entrance Lights (REL)

- Similar and adjacent to Taxiway centreline lead-on lights.
- Automated with THLs when runway occupied.
- Do not extend across full runway width.
- Do not appear like a stopbar across the entrance.
- Will illuminate red whilst lead-on green lights are also visible as the systems are not integrated.

Video illustrated RELs extinguishing BEFORE a departing aircraft passes – to permit a clearance to be issued in <u>anticipation</u> of time to enter runway.

Designed to allow controllers to operate with no change to their operating processes.

At DFW, RELs are not installed at all runway entrances; only the regularly used ones!

FAA Controllers operate a system where lights (some airports have stop bars) are extinguished <u>before</u> the verbal clearance, the principle being to avoid apparent conflicting verbal and visual messages. In the UK this is the opposite sequence, verbal first, then visual.

Effectively RWSL works in a similar manner to RIMCAS, but with indication to the pilot instead of the controller. It is an indication that a collision is possible, hence only really a last line of defence and not a runway access control – final safety net to prevent accident.

RWSL lights operate independently of other fitted AGL systems. Concern that if RWSL activates showing red lights, this conflicts with green centreline lights as they are not extinguished.

FAROS – Final Approach Runway Occupancy Signal, based on the PAPI – makes them flash a red signal to provide a warning to the landing aircraft. Warnings to landing aircraft was not an original objective of RWSL.

Paris CDG stats

30 average runway incursions per year since 2005; 3-5 Cat A/B.

Stop bars only used in LVP at CDG! < 3% of the time (1.5% of 2008, 1.4% of 2007, 2.7% of 2006).

CAPRICORN – vehicle GPS surveillance equipment used.

Peak max of 141/hr, day = 1773

80km of taxiways for 4 runways

Perimeter taxiways planned to go round 2 x runway ends to avoid runway crossings – others not possible due to geographical features (eg lake).

Total of 3 control towers, North, South and Central (night and standby)

4 x SMR's. 18 multi-lateration Mode S antennae. A-SMGCS Level 2 in operation. Note that this is a pre-requisite for RWSL operation.

Paris CDG RWSL Project

LRST proposed RWSL having also considered H24 stop bars. Controllers have 6-7 entrance points to control, suggested to be too complex, with reference made to other smaller airports with only 1 / 2 entrances. MAN operate @ 4 at any time.

Stop bars H24 too difficult at CDG, would lead to loss of efficiency and capacity (presumably as no stop bars at Cat 1 hold (90m), all are at Cat 3 position at 150m). Rather assumed than tested.

2011 in service date proposed, installed on 2 x inner runways.

Safety case being developed with Eurocontrol.

Cost not mentioned. Rumoured to be a collaborative development funded by the FAA? Totally separate infrastructure, independent from existing AGL Controls. Would situational awareness better with stop bars operated by Controllers?

Andy Taylor – LGW Head of ATC – NATS perspective

NATS standardised procedures, eg with conditional clearances, stop bar remains on until the relevant conditional aircraft has passed it. This differs from the practice in the USA where stopbars are installed.

Up to 55/hour, Runway Controller operates the stop bars (currently night and LVP).

Stop bars when used confirm the ATC clearance. They do not indicate the 'status' of the runway. But if an error is made, controller can drop stop bar for aircraft to enter when runway is in use/occupied.

RWSL gives no indication to the pilot of clearance from ATC – eg when flights go out as aircraft passes/runway is unoccupied. Where several runway crossings take place in front of an aircraft lined up, could see an indication of THL lights going off/on – when off, could make incorrect assumption that it is clear to take off?

Failure mode of RWSL was queried. Does it fail to lights on, or lights off. What indication to ATC and what is the contingency measure? FAA stated that it has never failed in trials so far.

IFATCA – Marc Baumgartuer (Chief Executive) www.ifatca.org

Stopbar survey report presented:

Questionnaire sent to 39 member associations across 4 global regions. Response from 70 airports, 29 countries – 56 with stopbars.

Some inconsistencies in ICAO documents. Annex 11 (ATS) does not refer to use of stop bars.

Stop bars at night only by 8 airports out of 56. USA has no controller-operated stop bars.

Procedures for crossing, or not crossing, red stop bars vary widely. Confusion where the approach varies for taxiway stop bars compared to runway stop bars.

Report makes several observations/recommendations:

- ICAO provisions to be consistent and unambiguous
- Standard contingency to use Follow Me
- Contingency only for removing vehicles or aircraft stuck at the failed stop bar
- ATC never to instruct to cross a red stop bar

RWSL comments:

- Developed in USA where no controller operated stop bars exist.
- Controller has no input – RWSL is fully automated
- Only works with A-SMGCS equipped airport with all vehicles transponder equipped
- Seen as a pure safety net

DALPA – Pilot Perspective (KLM)

Runways – essential for take-off, landing but not for crossing? Can design out need to cross runways – to reduce risk, latent errors. Very keen to emphasise this.

Perimeter taxiway, extra taxiway length, cost, taxi time – but consistent in time, unlike variability of crossings.

Runway crossings should not be at high-energy point of runway. Again, suggested this should be designed out.

Coincidentally, at AMS after a near runway collision, a perimeted taxiway was constructed to avoid the need to cross the inner runway to/from the new runway.

RWSL – REL lights are not an ICAO standard, not within pilot training. Stop bar is clear and unambiguous. There will be doubts to pilots with the RWSL system. Confusion with red runway end lights?

Could be useful, but requires clarity, also regulatory guidance and standards.