Extract from "Croydon to Concorde" Capt R E Gillman, 1980

Pages 129-131.

"It is interesting to note that whereas in 1946, letdowns were being flown successfully in visibilities of 200 yards, now, even with more accurate beams and integrated instrument guidance, minimum runway visual ranges of 600 yards were the norm. This was due primarily to the approach speeds, of course, which had increased from 60 mph to nearly double that figure in ten years.

The whole business of getting down in bad weather was being examined more scientifically, too, and it was realized that the visual segment between completing the instrument approach and effecting the touchdown was the limiting factor. The criteria were threshold speed, runway visual range and the approach and runway lighting pattern, and using these, approach ban minima were established for each type of aircraft and every runway on the route network.

These figures were given the force of law, and if a captain commenced an approach when the runway visual range had been given as below the limit he faced prosecution. Furthermore, whatever visibility was being promulgated, if, on reach- ing the decision height he felt that the visibility was below limits, he was expected to initiate an overshoot from that - height. There should be no cases of coming down further 'to have a look'. The decision height for the various runways had also been calculated with care bearing in mind that the effective "slant visibility" from the flight deck was bound to be less than the horizontal visibility along the ground.

A couple of years previously, I had been one of a number of pilots involved with Dr Calvert's experiments on his simulator at the Royal Aircraft Establishment at Farnborough.
It was an ingenious device built to investigate the problems of the visual segment. The pilot had a control column and rudder bar, and by squinting through a monocular eyepiece could see an instrument panel motivated by the pilot's control inputs on the one hand, and beam signals on the other; thus it was possible to fly an ILS letdown on instruments.

Behind the pilot on the opposite side of the room was a large revolving drum with holes in its periphery and lights inside which threw a moving light pattern on the wall in front of the pilot reminiscent of the Calvert approach lighting pattern. I am relying on a twenty-five-year-old memory now, [*i.e .these trials were around 1954-5. SRL*] but I think that is how it worked.

The pattern could be varied according to the cloud base and visibility selected, and the effect was that when the pilot looked up at a decision height, he found himself running in apparently over the approach lights. A number of pilots of varying experience both civil and military flew letdowns under all conditions at a variety of speeds, and a number of common traits emerged.

Certainly all pilots were restrained in their use of bank angles near the ground, but it was also found that the faster an approach was flown, the easier it was to keep straight using

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the approach lighting. This was due undoubtedly to the peripheral stream effect of the lights flashing by, but a very disturbing trend also showed itself.

At the higher approach speeds associated with the new jet aircraft, every pilot on looking up from the instrument panel to the approach lights began to sink immediately below the glide path and became dangerously low before becoming aware of it. Although the Calvert approach lighting pattern was, and is, the best system ever produced, Dr Calvert admitted that it was inadequate for the sort of vertical guidance needed at the critical stage of the letdown, particularly when the pilot was trying to adjust his visual focus while at the same time adapting to different cues.

Captain Bill Baillie, the then General Manager Flight Operations, BEA, had been addressing himself to this problem for some time, and, as a result, he introduced the 'monitored approach system'.

This was based on a division of duties during the letdown to minimize the workload on the captain and to put him in the best position to adapt to the visual cues once decision height had been reached. The instrument letdown itself was flown by the co-pilot, with the captain monitoring and calling for flight path changes if necessary to keep the aircraft 4in the slot'. Just prior to decision height, the captain looked up seeking visual references.

If by decision height he had seen none, or considered them inadequate, he would say nothing. In the absence of an executive command, the co-pilot's brief was to call 'Overshooting' and initiate a climb-away without ever looking up from the instrument panel. If the captain did establish visual references, he called, 'I have control.' The co-pilot raised his hands clear of the control column replying 'You have control,' and the captain carried on to land visually.

Initially, captains did not react favourably to the idea, feeling perhaps that they were weakening their command status at a critical phase of the flight, so the management very wisely left it to their own discretion as to whether they used the technique or not during bad weather letdowns.

Those who did were soon sold on it. Where previously the captain had flown the letdown while being distracted by R/T exchanges, command decisions, flight deck drills etc., becoming on occasion a somewhat harassed one-man band, now he was left free to fulfil his proper function of overseeing the ship. The co-pilot, on the other hand, could concentrate undisturbed on flying an accurate exercise. As the critical visual segment was approached, the captain had more time to appraise the situation, adapt to the visual cues, and come to a decision.

Sensing that the idea was becoming generally acceptable, the Flight Operations Directorate made it mandatory and there were few dissenters. Surprisingly, other airlines were slow to adopt the idea initially, perhaps influenced by the thought 'it wasn't made here', but nowadays it is in common use, with one or two notable exceptions."