# HR2 Upper Pilot Investigation

International Aircraft Materials
Fire Test Forum Meeting

April 2021

MarlinEngineering

# HR2 Upper Pilot Investigation

Background

During the recent HR2 TRL6 exercise at the FAA Technical Center, it was noted on the MEI machine most of the Boeing standard panels caused the upper pilots to extinguish longer than the required 3 seconds per the rule. None of the tests were voided and eventually the flames did relight.

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During the recent HR2 TRL6 exercise at the FAA Technical Center, it was noted on the MEI machine most of the Boeing standard panels caused the upper pilots to extinguish longer than the required 3 seconds per the rule. None of the tests were voided and eventually the flames did relight.

It was not felt that the flames being extinguished affected the overall results and all values were retained.

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Since this phenomenon still occurs in industry and can cause many voided tests for what perfectly acceptable test values would be, it was decided to perform a separate research project to look for other solutions.

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It was also noted that the reason for the flames extinguishing was due to flame retardants being released from the burning test sample, not necessarily due to the force of the airflow.

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It was also noted that the reason for the flames extinguishing was due to flame retardants being released from the burning test sample, not necessarily due to the force of the airflow.

One suggestion was to manufacture a clip-on deflector made from a drip tray to slightly deflect the gases away from the pilot flames.

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Sample Holder with Deflector installed

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Deflector detail

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Test Protocol

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Baseline sample without deflector

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Baseline sample without deflector

Baseline sample with deflector

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Baseline sample without deflector

Baseline sample with deflector

Boeing sample without deflector

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Baseline sample without deflector

Baseline sample with deflector

Boeing sample without deflector

Boeing sample with deflector

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Test Result Summary

All test were conducted the same day in one session

| Sample Set (5 each) | Peak ($kW/m^2$) | Time to Peak (s) | 2 min. Total $kW*min/m^2$) |
|---|---|---|---|
| Baseline, no deflector | 42.6 | 76 | 48.0 |
| Baseline, with deflector | 39.1 | 27 | 39.5 |
| Boeing, no deflector | 46.6 | 18 | 38.2 |
| Boeing, with deflector | 49.0 | 18 | 31.1 |

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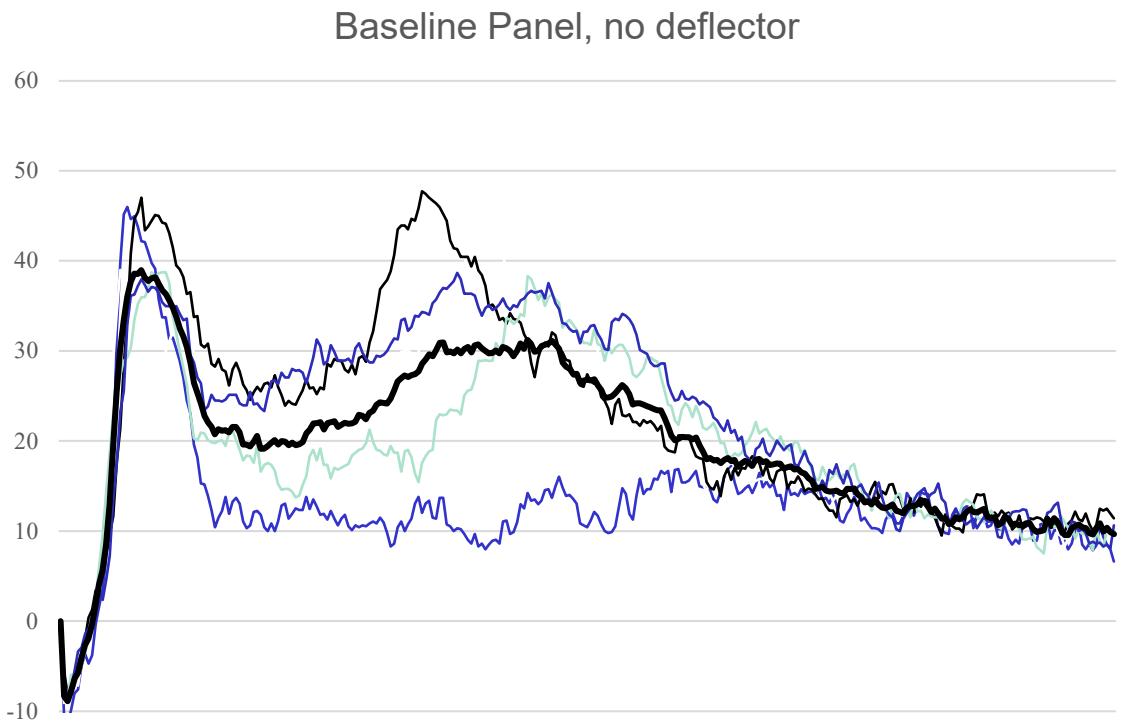
## Test Graphs

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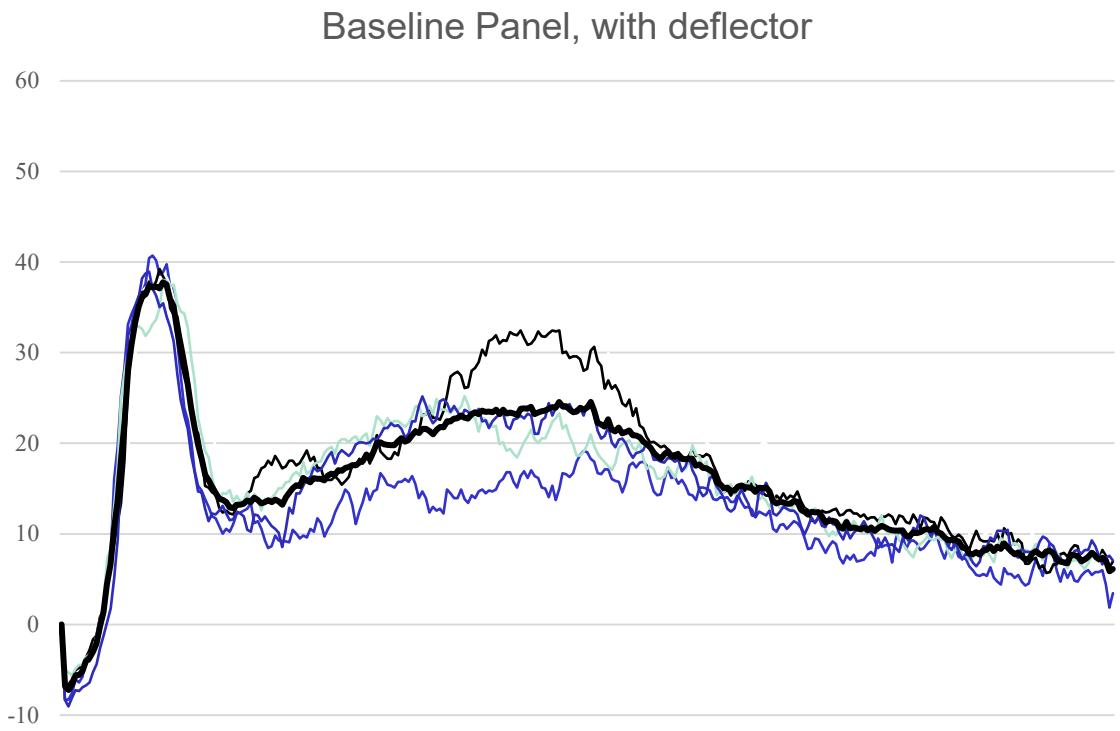


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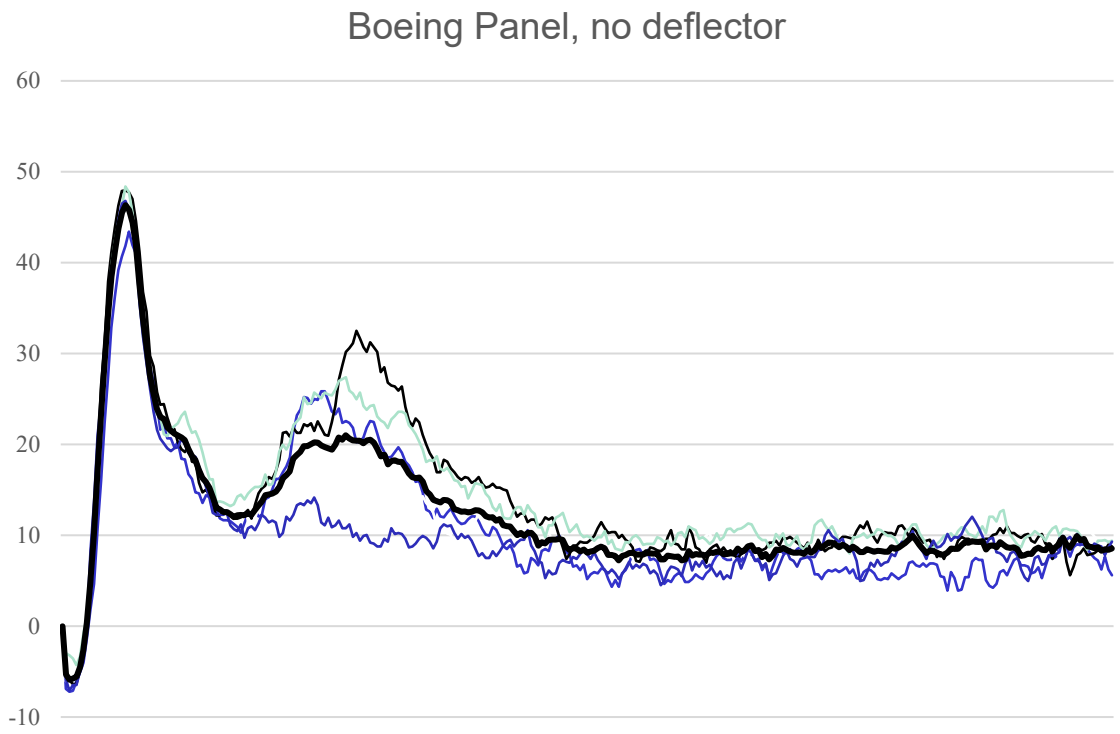


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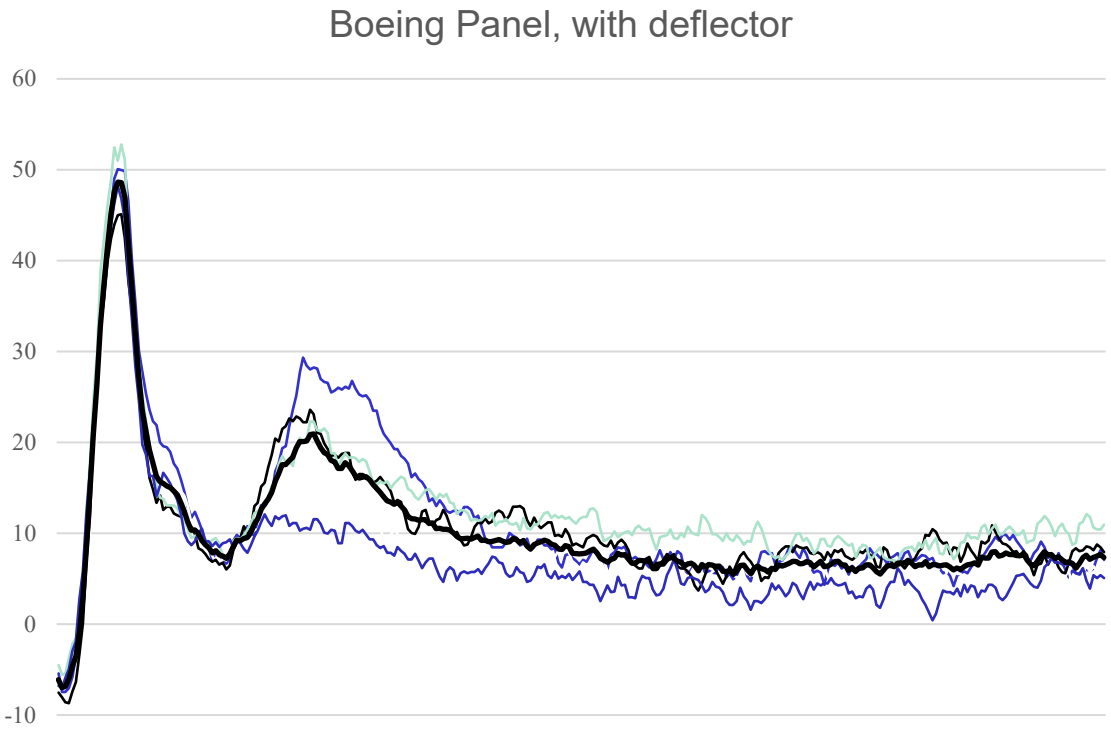


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Summary

The data from the baseline panels was too scattered to be of real use.

Unfortunately, none of the Boeing panels extinguished the pilot flames.

The deflector had a significant effect on both the peak and 2-minute values, particularly on the Boeing panels.

As a result, this is not the solution we were hoping for.

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Next Steps

Boeing has offered to provide more of their panels.

The plan is to try to increase the upper pilot flames on one set and to introduce a smaller foil deflector integral with the foil wrap.

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Questions??