



Reflections about fire test protocol for protection of cable ducts

Kristian Hox , SP Fire Research

Tests in cooperation with RG Systems



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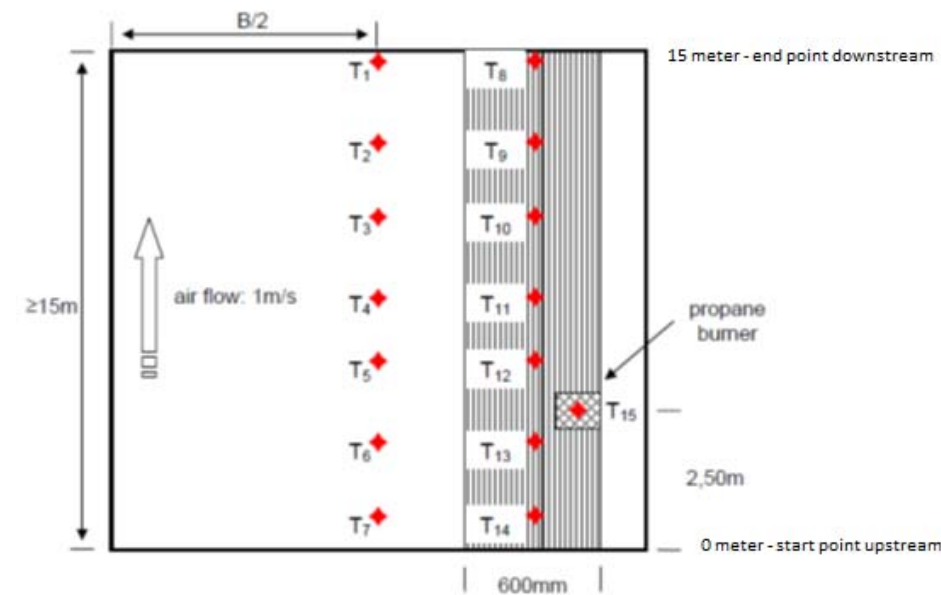
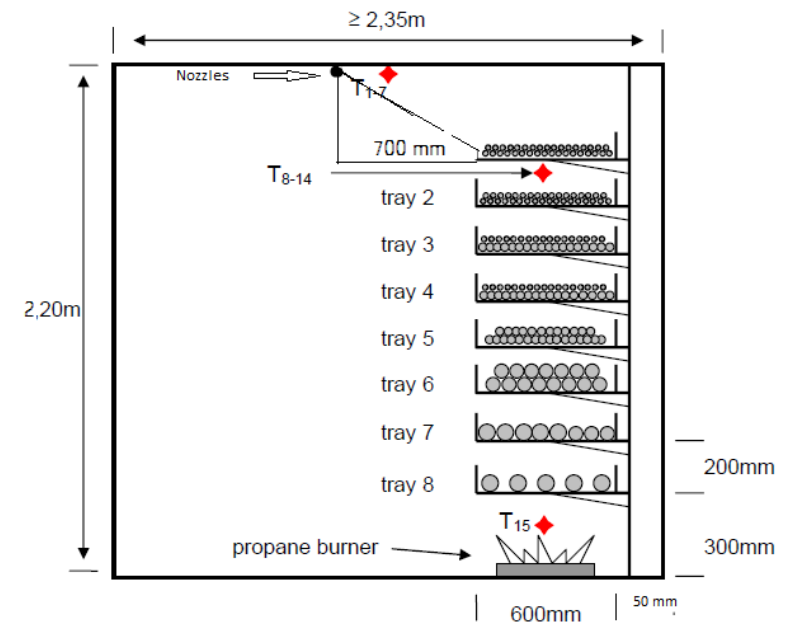


TEST PROTOCOL VDS CABLE DUCTS

- Ignition with propane burner 250 kW
- 5 min with burner
- 10 min freely development of fire
- In total 15 min preburn before manually activation of the system
- After 15 min of water application the test is finished

ACCEPTANCE CRITERIAS

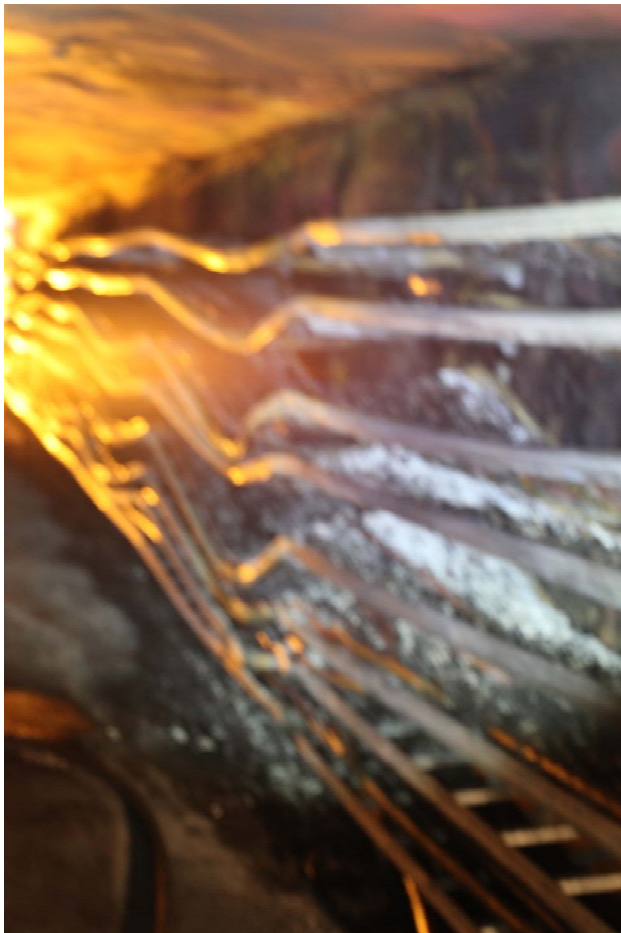
- Temperature decreased below 100 C within 5 min of activation of the extinguishing system
- No visible flames after 15 min of water application
- No damage on the cables 1 m from each end of the tunnel



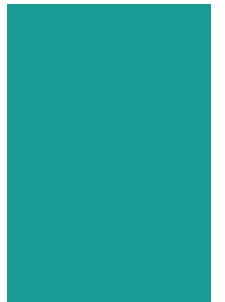
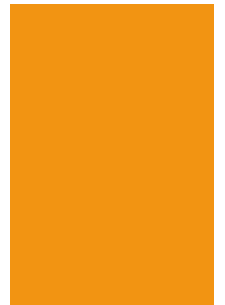


Tray	Cable type	∅	CU number	Number of cables
Tray 1	NYY-O 2×1.5	12 mm	29	35
Tray 2	NYY-O 2×1.5 J-Y(St)Y 12×2×0.8	12 mm 14 mm	29 123	30 10
Tray 3	J-Y(St)Y 12×2×0.8 NYY-J 4×10	14 mm 20 mm	123 384	20 20
Tray 4	J-Y(St)Y 12×2×0.8 NYY-J 4×10	14 mm 20 mm	123 384	20 10
Tray 5	NYY-J 4×10	20 mm	384	30
Tray 6	NYY-J 3×50/25	31 mm	1680	15
Tray 7	NYY-J 3×50/25 NYY-J 4×120	31 mm 42 mm	1680 4608	3 5
Tray 8	NYY-J 4×120	42 mm	4608	5

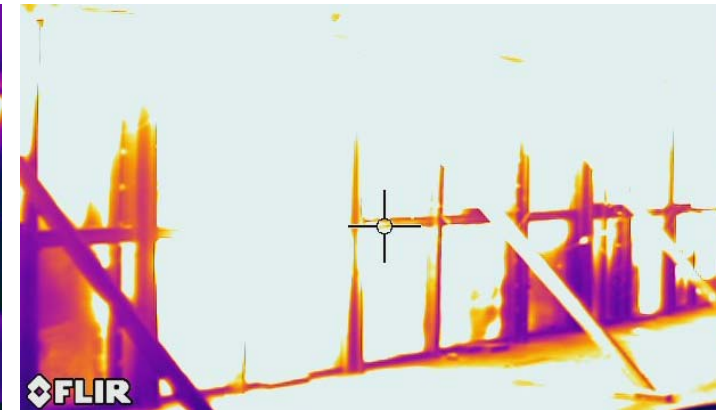
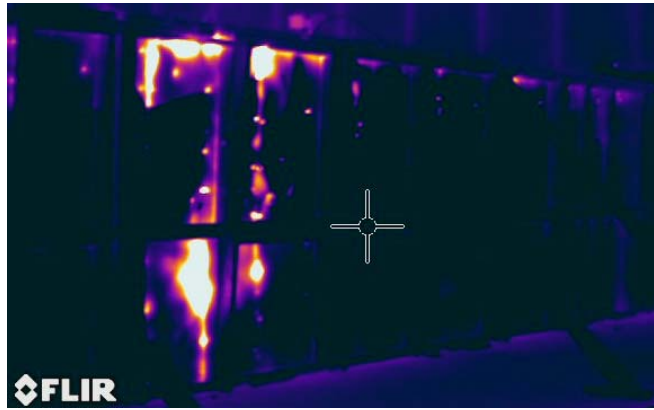
INITIAL TESTS



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CABLE DAMAGE AND FIRE SPREAD



15 14.5 14 13.5 13 12.5 12 11.5 11 10.5 10 9.5 9 8.5 8 7.5 7 6.5 6 5.5 5 4.5 4 3.5 3 2.5 2 1.5 1 0.5 0



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CONCLUSION FROM INITIAL TESTS

- The damage criterion is violated before the extinguishing system is allowed to operate.
- After 15 minutes the fire is very large compared to previous tests

POSSIBLE SOLUTIONS

- New cables
- Set new damage criterion from initial tests
- **Adjust the preburn time to extent of fire and temperatures is similar to previous tests**

Preburn time was set to 8 minutes and that the last thermocouple between the trays must reach 400 C

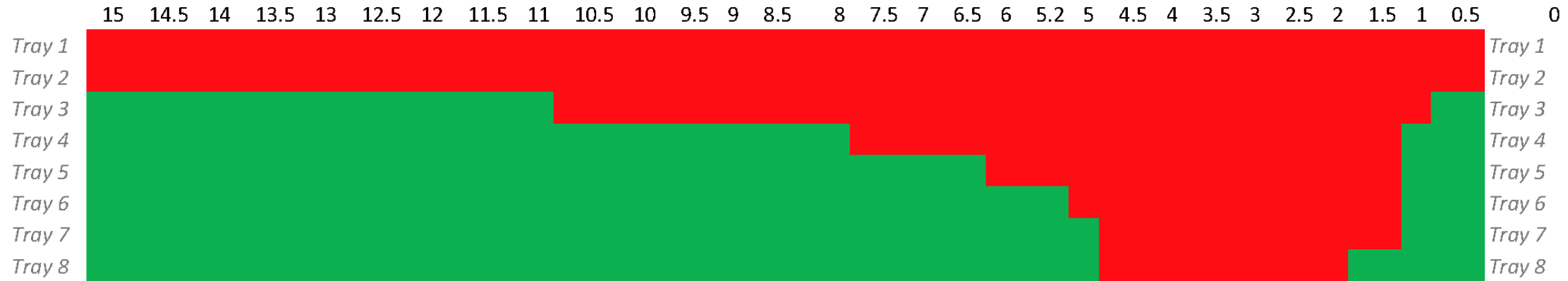




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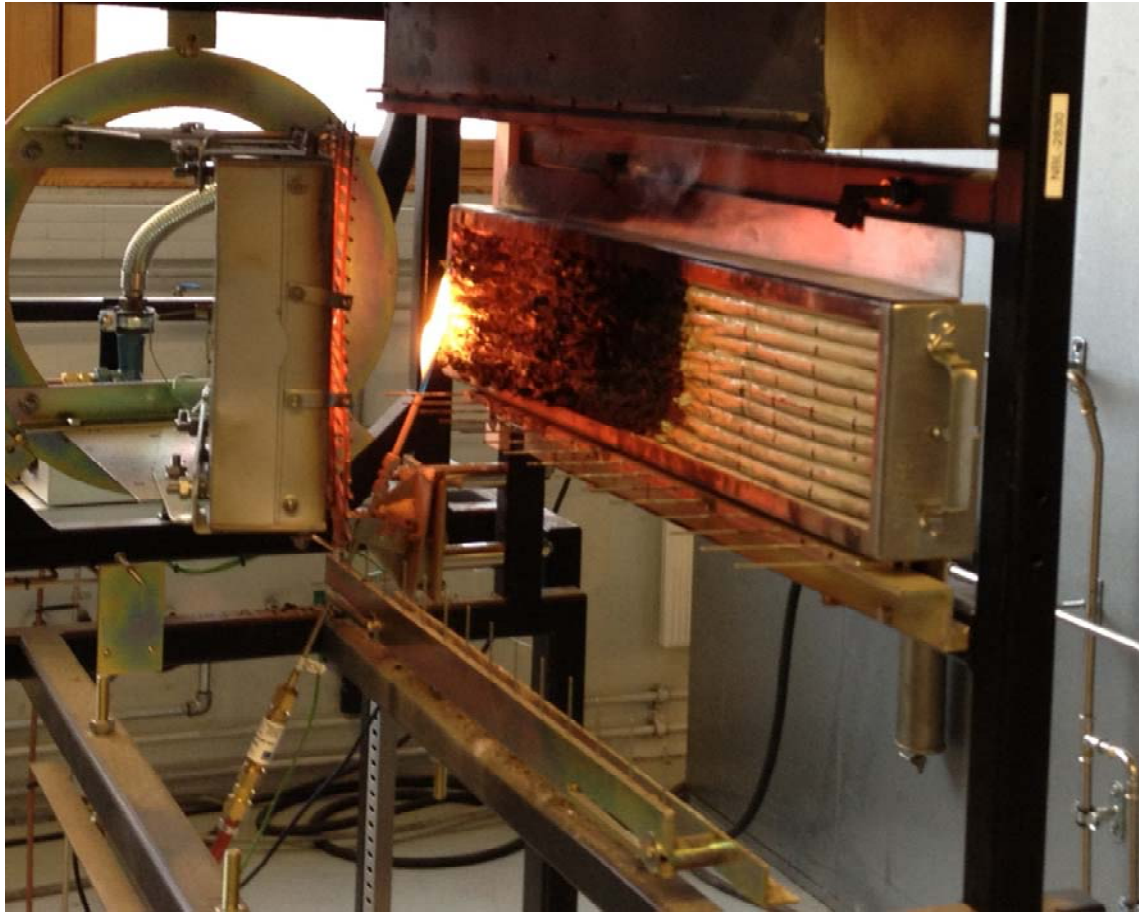
CABLE DAMAGE



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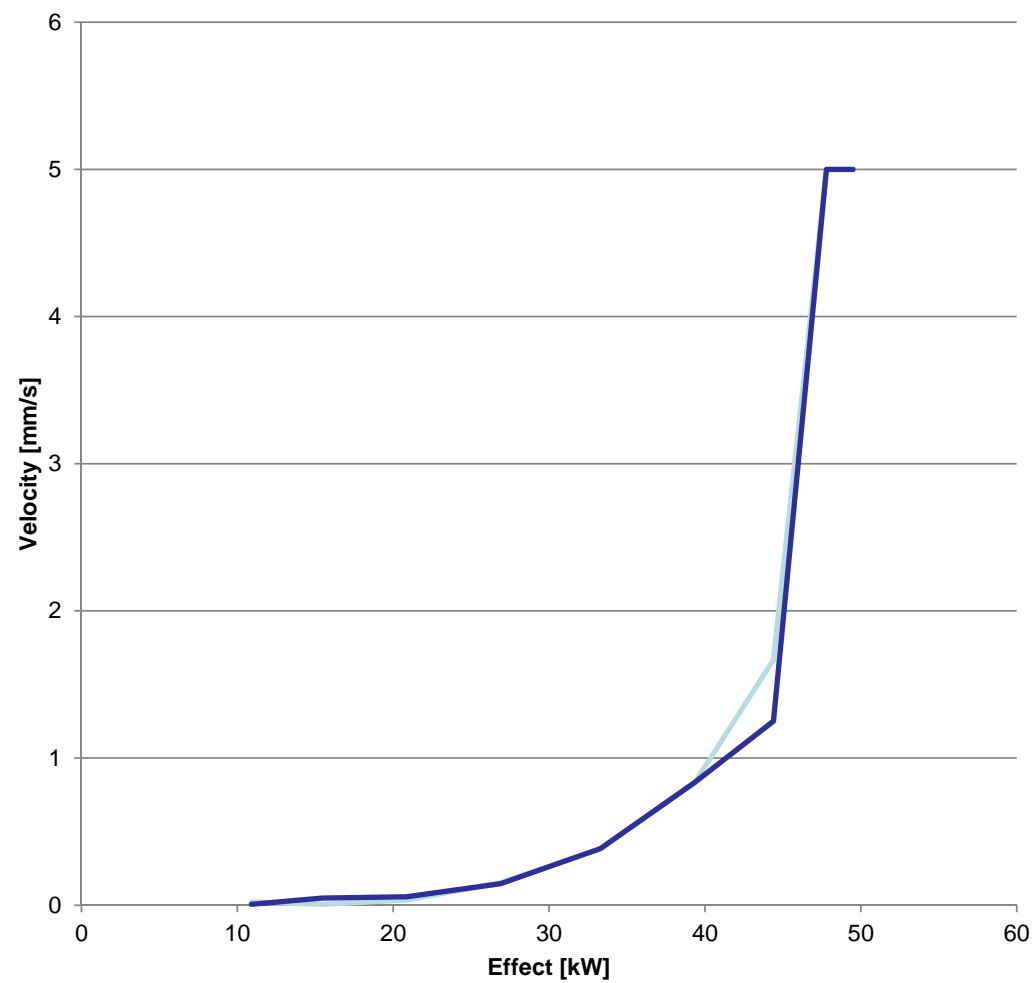
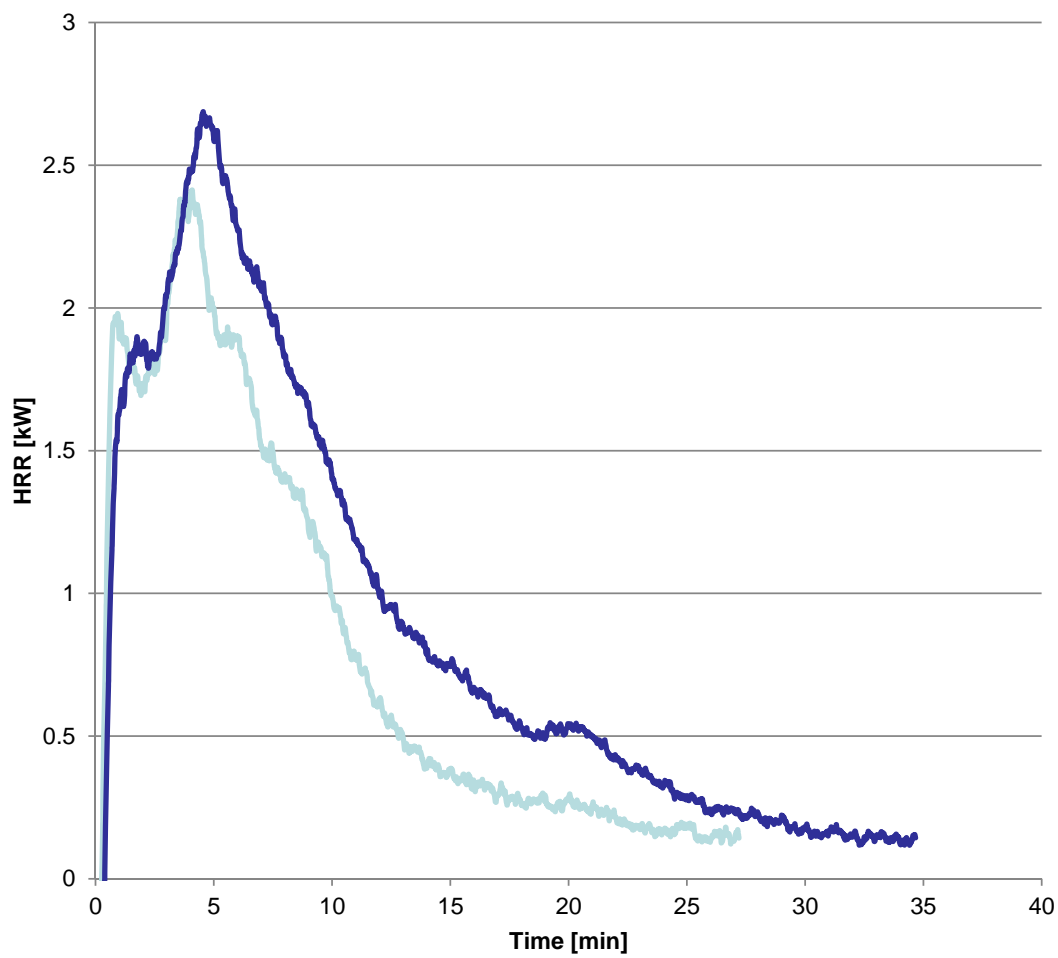


IMO FTP CODE PART 5



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POSSIBLE SOLUTIONS

- The burning characteristics of the cables must be determined in the standard
- Use temperature criteria to determine preburn time





Contact us

Telephone: +47 464 18 000

E-mail: post@spfr.no

www.spfr.no