Firebrand flux

186 m

0 m

320 m

FBP X

FBP Y

FBP Z

FCS X

FCS Y

FCS Z

Fire line

Road

320 m

160 m

300 m

250 m

150 m

100 m

50 m

Case A: 2 m

Case B,C: 7m

1. Increasing the Fireline depth

Case A: 2 m (x=186 m to 188 m)

Case B: 7 m (x=183.5 m to 190.5 m)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Case | Wind velocity  (m/s) | Initial  Temperature  (0C) | Particle velocity  (U,V,W) m/s | Ember input rate pcs/s | Flux (pcs/m2/s) | | |
| FCS Z | FCS Y | FCS X |
| **A**:depth 2m | ≈2.2 | 361 | (8.3, 0.0, 2.1) | 11006 | 1.946 | 0.977 | 0.798 |
| **B**:depth 7 m | ≈2.27 | 361 | (8.3, 0.0, 2.1) | 13317 | 1.330 | 0.950 | 0.881 |
| **C**:depth 7 m | ≈2.27 | 1044 | (8.3, 0.0, 2.1) | 13317 | 1.244 | 1.035 | 0.862 |
| Experiment | 1.4±0.6 | NA | NA | NA | 1.361 | 0.902 | 0.824 |

Firebrand flux differences

|  |  |  |  |
| --- | --- | --- | --- |
|  | Difference (%) | | |
| FCS Z | FCS Y | FCS X |
| Case **A (2 m)** to Experiment | 30.0 | 7.6 | -3.3 |
| Case **B (7 m)** to Experiment | -2.3 | 5.1 | 6.4 |
| Case **C (7 m)** to Experiment | -9.4 | 12.8 | 4.4 |

Input number of firebrands

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Input number of firebrands** | | **% increment of Case A to Case B,C** |
| **Size class** | **Case A** | **Case B,C** |
| 1S (smallest) | 8806 | 10517 | 16.2 |
| 2S | 684 | 684 | 0.0 |
| 3S | 70 | 70 | 0.0 |
| 4S | 338 | 338 | 0.0 |
| 5S | 485 | 485 | 0.0 |
| 6S (largest) | 623 | 1223 | 49.1 |
| **Total** | **11006** | **13317** | **17.4** |
| Landing firebrand flux vs size comparison of the experiment and the simulation-  case A (fireline depth 2m and T=361 0C) | | | | |

|  |
| --- |
| Landing firebrand flux vs size comparison of the experiment and the simulation -  case B (fireline depth 7m and T=361 0C) |

|  |
| --- |
| Landing firebrand flux vs size comparison of the experiment and the simulation -  case C (fireline depth 7m and T=1044 0C) |

Firebrand input rate (Case B and C) = 13 317 pcs/s

Average HRR = 2687 MW

Firebrand generation rate =(13 317 pcs/s)/(2687 MW)

=4.956 pcs/MW/s

|  |
| --- |
| Firebrand accumulation (location)- case B (fireline depth 7m T 361 0C)  Firebrand accumulation (shape) |