

RE: JRIII - FLACS simulations

Shona Mackie <shona.mackie@gexcon.com>

Fri 29/04/2022 08:41

To: Joseph Chang <jchang@rand.org>; Simon Gant <Simon.Gant@hse.gov.uk>

Cc: Chris Coffey <Chris.Coffey@gexcon.com>; Djurre Siccama <Djurre.Siccama@gexcon.com>; Rory Hetherington <Rory.Hetherington@hse.gov.uk>; Lorenzo Mauri <Lorenzo.Mauri@gexcon.com>

 22 attachments (34 KB)

requested_arcmax_conc.txt; requested_arcmax_conc_meashts.txt; requested_arcmax_conc_meashtsFLASH.txt; requested_arcmax_concFLASH.txt; DT2-FLACS-5-flat-1m.csv; DT2-FLACS-5-parabolic-1m.csv; DT2-CERC-2-flat-1m.csv; DT2-FLACS-2-flat-1m.csv; DT1-FLACS-2-flat-1m.csv; DT1-CERC-2-flat-1m.csv; DT2-CERC-5-parabolic-1m.csv; DT1-FLACS-5-parabolic-1m.csv; DT1-CERC-5-flat-1m.csv; DT1-CERC-5-parabolic-1m.csv; DT1-FLACS-5-flat-1m.csv; DT2-CERC-5-flat-1m.csv; DT4-FLACS-2-flat-1m.csv; DT4-CERC-2-flat-1m.csv; DT4-FLACS-5-parabolic-1m.csv; DT4-FLACS-5-flat-1m.csv; DT4-CERC-5-parabolic-1m.csv; DT4-CERC-5-flat-1m.csv;

Hi Simon

Apologies for the slow response, since your email we have been focused on the latest release of FLACS.

I have rerun the FLADIS simulations that we submitted previously, but I included a 'terrain' in the scenarios this time to allow for heat exchange between the plume and the ground (this was not considered in the previous runs). I have attached the results in the same format as before (requested_arcmax_conc files)– using the provided source term and using the source term that we calculated in-house using the FLASH utility (files are suffixed '_FLASH'). I have also attached the maximum concentration simulated at the sensor heights for the three arcdistances (requested_arcmax_conc_meashts files)–. The heights are 0.1 m, 0.5 m and 1.5 m for arcdistances of 20 m, 70 m and 238 m. These are from the workshop information pdf, and are the same as in the Neilsen paper, but I notice that your email mentions 0.5 m, 1 m and 1.5 m heights so let me know if you would like concentrations at those heights instead. As before, we simulated both Pasquill classes for FLADIS 16 and FLADIS 24.

Lorenzo has calculated the max concentrations at 1 m height for the Desert Tortoise campaign and these are also attached (*.csv files). Two different concentration distributions were used for the equivalent source – flat and parabolic.





Let me know if anything doesn't make sense or if you need anything else.

Kind regards
Shona**Shona Mackie**

Senior Research Engineer

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From: Joseph Chang <jchang@rand.org>
Sent: Tuesday, April 12, 2022 3:45 PM
To: Simon Gant <Simon.Gant@hse.gov.uk>; Lorenzo Mauri <Lorenzo.Mauri@gexcon.com>; Shona Mackie <shona.mackie@gexcon.com>
Cc: Chris Coffey <Chris.Coffey@gexcon.com>; Djurre Siccama <Djurre.Siccama@gexcon.com>; Rory Hetherington <Rory.Hetherington@hse.gov.uk>
Subject: RE: JRIII - FLACS simulations

Thank you, Lorenzo.

From: Simon Gant <Simon.Gant@hse.gov.uk>
Sent: Tuesday, April 12, 2022 9:25 AM
To: Lorenzo Mauri <Lorenzo.Mauri@gexcon.com>; Shona Mackie <shona.mackie@gexcon.com>
Cc: Chris Coffey <Chris.Coffey@gexcon.com>; Djurre Siccama <Djurre.Siccama@gexcon.com>; Rory Hetherington <Rory.Hetherington@hse.gov.uk>; Joseph Chang <jchang@rand.org>
Subject: [EXT] RE: JRIII - FLACS simulations

Hi Lorenzo,

That's great, thanks for agreeing to output those results. For sure, after Easter is fine.

We'll get in touch with the other CFD modelling teams and see if they'd like to collaborate on some kind of joint CFD comparison. Thanks for responding positively. We'll keep you posted about a call with them.

Hope you all have a nice Easter. Best wishes,

Simon



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Currently working from home, contactable on the above mobile phone number or by email

From: Lorenzo Mauri <Lorenzo.Mauri@gexcon.com>
Sent: 12 April 2022 14:02
To: Simon Gant <Simon.Gant@hse.gov.uk>; Shona Mackie <shona.mackie@gexcon.com>
Cc: Chris Coffey <Chris.Coffey@gexcon.com>; Djurre Siccama <Djurre.Siccama@gexcon.com>; Rory Hetherington <Rory.Hetherington@hse.gov.uk>; Joseph Chang <jchang@rand.org>
Subject: RE: JRIII - FLACS simulations

Hi Simon,

I hope you are doing well, here in Bergen spring is slowly taking over while we are busy with the upcoming software release.

We can certainly provide simulated concentrations at the specific elevations, however will not be able to provide the data this week, but right after Easter holidays. I hope this is OK.

We did not plan to present FLACS results at GMU or Harmo but we are positive on the idea of presenting a comparison with the other results, from simulations performed with FDS, Code Saturne or other CFD tools. We are open for discussion to see if there is interest from the other teams and from which angles the comparison can be performed, we would be grateful if you could facilitate a call.

Best regards,
Lorenzo

Lorenzo Mauri

Principal Research Engineer

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From: Simon Gant <Simon.Gant@hse.gov.uk>

Sent: 12 April 2022 11:34

To: Lorenzo Mauri <Lorenzo.Mauri@gexcon.com>; Shona Mackie <shona.mackie@gexcon.com>

Cc: Chris Coffey <Chris.Coffey@gexcon.com>; Djurre Siccama <Djurre.Siccama@gexcon.com>; Rory Hetherington <Rory.Hetherington@hse.gov.uk>; Joseph Chang <jchang@rand.org>

Subject: RE: JR111 - FLACS simulations

Hi Lorenzo and Shona,

How are things going in Bergen? Since we last spoke on 25 March about the Jack Rabbit III modelling, we've received three sets of CFD model predictions for the FLADIS trials from:

1. Bertrand Carissimo, ENPC/CEA – Code Saturne 7.0
2. Stephane Burkhart, DGA – Code_Saturne
3. Jean-Marc Lacome, INERIS – FDS

Stephane is also in the process of producing Code_Saturne results for Desert Tortoise. Jens Christian Bennetsen at Ramboll said that he would also try and produce some CFD results this month.

The FLADIS trials are slightly awkward when it comes to comparing model predictions to measured concentrations because the height of the sensors was different on the three arcs of sensors. If you recall, the heights were 0.5 m, 1.0 m and 1.5 m, at the arcs at 20 m, 70 m, and 238 m (or 240 m), respectively. The three other CFD modelling teams have all output concentrations at these sensor positions, whereas in your submission you outputted the maximum plume centerline concentrations. To enable like-for-like comparisons, would it be possible for you to output concentrations from FLACS at these sensor positions? It would be really helpful for us in cross-plotting the results.

It's very useful that you provided the centerline concentrations, since we could compare these results to the point values at the sensor positions to assess the spatial variation of concentration and understand how likely it was for the sensors to measure the maximum plume concentrations.

Do you have any plans to present your FLACS modelling at one of the conferences this year – maybe GMU or Harmo? I was wondering if you'd considered working with the other CFD teams to produce a joint presentation, comparing/contrasting the different CFD modelling approaches? It would make an interesting study. We're happy to facilitate a call with the other teams if you'd like to pursue this. Joe, Rory and I will be presenting cross-plots of all 20+ modelling results at the GMU and Harmo meetings, but we will have a limited amount of time to go into details of each modelling approach, so a separate presentation on the CFD modelling would be great. I haven't yet spoken to Bertrand, Stephane or Jean-Marc about this – I thought I'd run the idea past you first.

The description of the FLADIS trials is attached to this email, just for ease of reference. We updated this document recently to clarify the plume width σ_y meant plume half-width (in response to some comments/queries from other modellers).

Best wishes, Simon



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Currently working from home, contactable on the above mobile phone number or by email

From: Lorenzo Mauri <Lorenzo.Mauri@gexcon.com>

Sent: 28 February 2022 18:46

To: Simon Gant <Simon.Gant@hse.gov.uk>; jchang@rand.org

Cc: Shona Mackie <shona.mackie@gexcon.com>; Chris Coffey <Chris.Coffey@gexcon.com>; Djurre Siccama <Djurre.Siccama@gexcon.com>

Subject: JR111 - FLACS simulations

Dear Simon and Joe,

here are the text files with results (maximum concentrations) from our simulations of the selected FLADIS and Desert Tortoise cases performed using FLACS.

We have written some notes on the assumptions, methodology and sensitivity cases, you will find them as a pdf file in the attached zip archive together with the text files.

Let us know if you have any questions and many thanks for coordinating the modelling exercise!

Best regards,
Lorenzo and Shona

Lorenzo Mauri

Principal Research Engineer

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