

Document details

[< Back to results](#) | 1 of 1[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More... >](#)CFD Letters [Open Access](#)
Volume 11, Issue 2, 2019, Pages 42-49

Evaluation of air flow pattern for conceptual design of automotive painting line using computational fluid dynamic (Cfd) for better dust particle reduction (Article)

Yosri, M.H.^a, Muhamad, P.^a, [✉](#) Yatim, N.H.M.^b [👤](#)^aIntelligent Dynamics & System Research Lab, Malaysia-Japan International Institute of Technology, Universiti Teknologi Malaysia, Kuala Lumpur, 54100, Malaysia^bDepartment of Mechanical Engineering, Kulliyah of Engineering, International Islamic University Malaysia, Kuala Lumpur, 50728, Malaysia

Abstract

[View references \(18\)](#)

In the painting production process, repairing of paint work defects by running the part through repeat process, together with the essential requirement quality control routines, account for a very large proportion of the operating costs. The dust and fibre defects is ranged between 40% and 50% and found to be the highest rejection from one of the local industry painting line. Hence that, this research is focused to study the effectiveness of simulating this painting line using Computational Fluid Dynamic (CFD) method to identify the air flow and turbulence pattern which may help to understand the particle concentration and movement in the painting line. Six mechanical designs of ventilation system was proposed in order to study the particle movement and concentration to this automotive painting line. From here, the best design which suite the objective of minimizing the particle concentration and its dissipation into the painted part are justified. Hence, improvement action such as layout arrangement and mechanical design are factors involved to overcome and minimize the foreign particle from fall down into the parts during the painting process. The result from this study may also be a benchmarking for future design of new automotive painting line. © 2019, Penerbit Akademia Baru. All rights reserved.

SciVal Topic Prominence [📄](#)

Topic: [Paint](#) | [Powder coatings](#) | [Coatings](#)Prominence percentile: 51.769 [📄](#)

Author keywords

[Automotive Painting Line](#) [Computational Fluid Dynamic](#) [Particle concentration](#) [Turbulence Models RNG k](#) [ε model](#)

ISSN: 21801363

Source Type: Journal

Original language: English

Document Type: Article

Publisher: Penerbit Akademia Baru

References (18)

[View in search results format >](#)[All](#) [Export](#) [Print](#) [E-mail](#) [Save to PDF](#) [Create bibliography](#)

Metrics [📄](#)

0 Citations in Scopus

0 Field-Weighted Citation Impact



PlumX Metrics [▼](#)

Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

Cited by 0 documents

Inform me when this document is cited in Scopus:

[Set citation alert >](#)[Set citation feed >](#)

Related documents

Air ionizer application for electrostatic discharge (ESD) dust removal in automotive painting industry

Yosri, M.H. , Muhamad, P. , Ismail, M.A. (2018) *IOP Conference Series: Materials Science and Engineering*

How to simplify computer simulated persons (CSPs) for modeling personal microenvironments: Comparison and case studies

Yan, W. , Yang, X. , Shan, M. (2009) *ASHRAE Transactions*

Investigating ventilation system performance in large space building: A nozzle primary air supply with secondary airflow-relay system

Wang, H. , Tang, X. , Huang, C. (2017) *Science and Technology for the Built Environment*

View all related documents based on references

1 *Combat Coating (M) Sdn Bhd, Outgoing Quality Inspection Passrate Report*, pp. 2015-2016.

Find more related documents in
Scopus based on:

Authors > Keywords >

2 Bascom, R., Kesavanathan, J., Swift, D.L.
Human susceptibility to indoor contaminants.
(1995) *Occupational medicine (Philadelphia, Pa.)*, 10 (1), pp. 119-132. Cited 15 times.

3 Holbrook, D.
Controlling contamination: The origins of clean room technology
(2009) *History and Technology*, 25 (3), pp. 173-191. Cited 12 times.
doi: 10.1080/07341510903083203
[View at Publisher](#)

4 Havet, M., Blay, D.
Numerical study of coupled convective, radiative and conductive heat transfer in a large enclosure
(1994) *Fourth International Conference on Air Distribution in Rooms*, pp. 15-17. Cited 2 times.
Application to radiant heating, Roomvent'94." In

5 Srebric, J., Vukovic, V., He, G., Yang, X.
CFD boundary conditions for contaminant dispersion, heat transfer and airflow
simulations around human occupants in indoor environments
(2008) *Building and Environment*, 43 (3), pp. 294-303. Cited 74 times.
doi: 10.1016/j.buildenv.2006.03.023
[View at Publisher](#)

6 Thongsri, J., Pimsarn, M.
Optimum airflow to reduce particle contamination inside welding automation
machine of hard disk drive production line
(2015) *International Journal of Precision Engineering and Manufacturing*, 16 (3), pp. 509-515. Cited 13
times.
<http://www.springerlink.com.ezproxy.um.edu.my/content/2234-7593/>
doi: 10.1007/s12541-015-0069-2
[View at Publisher](#)

7 Rouaud, O., Havet, M.
Numerical investigation on the efficiency of transient contaminant removal from a
food processing clean room using ventilation effectiveness concepts
(2005) *Journal of Food Engineering*, 68 (2), pp. 163-174. Cited 20 times.
doi: 10.1016/j.jfoodeng.2004.05.029
[View at Publisher](#)

8 Noh, K.-C., Kim, H.-S., Oh, M.-D.
Study on contamination control in a minienvironment inside clean room for yield
enhancement based on particle concentration measurement and airflow CFD
simulation
(2010) *Building and Environment*, 45 (4), pp. 825-831. Cited 22 times.
doi: 10.1016/j.buildenv.2009.09.001
[View at Publisher](#)