Practical relation for estimation of air pollution induced by cars in enclosed parking lots

Javad Amnian, Mehdi Maerefat*

Mechanical Engineering, Tarbiat Modares University, Tehran, Iran.
* P.O.B. 14115-143 Tehran, Iran, maerefat@modares.ac.ir

ARTICLE INFORMATION

Research Note
Received 07 September 2016
Accepted 19 September 2016
Available Online 22 October 2016

Abstract

By using the initial estimation of CO concentration in enclosed parking lots, the designer could design pollution dispersion system with assurance of producing good air quality. In this paper, the practical correlation of CO increasing due to cars and time in enclosed parking lots is proposed. The proposed model is represents the variation of CO concentration in parking lot according to functional parameters. In addition to air flow ventilation, the effect of CO removal effectiveness on the air quality of enclosed parking lots is expressed in the proposed relation.

Keywords:
Pollution dispersion
multiple floor parking lots
pollution increasing
numerical simulation

Please cite this article using:
Amnian, M. Maerefat, Practical relation for estimation of air pollution induced by cars in enclosed parking lots, Modares Mechanical Engineering, Vol. 16, No. 11, pp. 445-448, 2016 (in Persian)
2- پارکینگ‌های سطحی مお話ی از پارکیردرودین انواع پارکینگ‌های زیرزمینی

پارکینگ‌های سطحی مお話ی از پارکیردرودین انواع پارکینگ‌های زیرزمینی

3- رابطه تغییر غلظت آلانه‌دیبا زمان و سایر متغیرها

همان‌گونه که نتایج شکل 2 نشان می‌دهد افزایش غلظت موشک‌دار بی‌هوش

<table>
<thead>
<tr>
<th>جدول 1</th>
<th>مقدار کارایی آلانه‌دیبا بر حسب نوع جوهرberry</th>
</tr>
</thead>
<tbody>
<tr>
<td>کارایی خروجی آلانه‌دیبا (کا)</td>
<td>رایج جریان</td>
</tr>
<tr>
<td>&lt; 1</td>
<td>&lt; 1</td>
</tr>
</tbody>
</table>

446
Fig. 3 Comparison of numerical results and proposed correlation

\[ t^* = t \cdot 60 \left( \frac{7}{H} \right) \]

\[ C^* = \frac{1000 \text{mm}^2/\text{t}}{q} \]

Numerical Results

Equation 3 )1( ݐכ= ݐή60ሶ݃

)2( ܥכ= ܥ

1000n݉ሶݍߦΤ  

)3(  ܥכ= 1

9 (1
5 lnݐכ৆1)

\[ t^* = t \cdot 60 \left( \frac{7}{H} \right) \]

\[ C^* = \frac{1000 \text{mm}^2/\text{t}}{q} \]

\[ C = \frac{1}{9} \ln (t^* - 1) \]

\[ C = \frac{1}{9} \left( \ln t + \ln 60 \left( \frac{7}{H} \right) - 1 \right) \]

Rearranges the data in Equation 3, where \( C^* \) is the mass flux of water, \( t^* \) is the time in minutes, \( H \) is the height of the water column, and \( q \) is the flow rate in g/s.

Equation 3 is:

\[ C = \frac{1}{9} \left( \ln t + \ln 60 \left( \frac{7}{H} \right) - 1 \right) \]

\[ t^* = t \cdot 60 \left( \frac{7}{H} \right) \]

\[ C^* = \frac{1000 \text{mm}^2/\text{t}}{q} \]
Fig. 4 Comparison of CO concentration results, normal ventilation

Fig. 5 Comparison of CO concentration results, enhanced ventilation