

YUK AVTOMOBILINI MARSHRUTDA BAJARGAN ISHINI ANIQLASH

Tursunov D.M.

ANNOTATSIYA

Yuk avtomobilining samaradorligini aniqlash uchun uning baholash mezonini belgilab olish zarur. Bunun uchun yuk avtomobilining marshrutda bajargan fizik ishini aniqlash va bu asosda baholash me'zonini asoslash kerak. Bu bo'limda yuk avtomobilini turli harakat sikllarida turlicha yuklanganlik holatida bajargan fizik ishi nazariy jihatdan taxlil qilingan

Kalit so'zlar: harakat rejimi, kuch va quvvat balansi, harakatlanish vaqti.

Davr talabi asosida avtomobillarda alternativ energiya manbalaridan foydalanish avj olib bormoqda. Harakat uchun sarflangan bajarilgan ish miqdorini aniqlash, yonilg'i turidan qat'i nazar, avtomobillarning yonilg'i sarfini me'yorlash hamda harakat sikllarining murakkablik darajasini baholash imkonini beradi. Harakat sikllarining bajarilgan ish sarfini aniqlash uchun harakat rejimlari qirqimida avtomobillarning bajarilgan ishini aniqlash lozim. Bajarilgan ishni aniqlashning birinchi bosqichi harakat rejimlari uchun kuch va quvvat balansini qurishdir. Avtomobillarning tezlanish rejimida harakat davri uchun bajarilgan sarfini aniqlash tartibini ko'rib chiqamiz.

Tezlanish rejimida avtomobillarning quvvat balansi quyidagi ko'rinishga ega:

$$N_T = m_a \cdot \delta_{ep} \cdot v_a \cdot \frac{dv_a}{dt_y} + (P_e + P_f) \cdot v_a; \quad (2.1)$$

$$N_T \cdot dt_y = m_a \cdot \delta_{ep} \cdot v_a \cdot dv_a + (N_e + N_f) \cdot dt_y, \quad (2.2)$$

Bu yerda: N_T – tortuvchi quvvat (Vt);

N_f – g'ildirakning g'ildirashiga sarflangan quvvat (Vt);

N_e – havoning qarshiligini engishga sarflangan quvvat (Vt);

P_e – havoning qarshilik kuchi (N);

P_f – g'ildirashga qarshilik kuchi (N);

t_y - tezlanish vaqti (s);

v_a - avtomobil tezligi (m/s);

δ_{ep} – aylanib harakatlanuvchi qismlarning inertligini inobatga oluvchi koeffitsient, $\delta_{ep} = (1,03 + 0,03 * U_i^2)$;

U – uzatmalar qutisi uzatishlar soni;

m_a – avtomobilning massasi.

Avtomobilning tezlanishi uchun kerakli bo'ladigan bajarilgan ish E_{yck} ni quyidagicha ifodalaymiz:

$$dE_{yck} = N_T \cdot dt_y; \quad (2.3)$$

$$dE_{yck} = m_a \cdot \delta_{ep} \cdot v_a \cdot dv_a + (N_e + N_f) \cdot dt_y, \quad (2.4)$$

(2) tenglamaning ikki tomonini integrallash orqali quyidagini olamiz:

$$\begin{aligned} E_T &= m_a \cdot \delta_{ep} \cdot \frac{v_k^2 - v_n^2}{2} + \int_0^{t_y} (N_e + N_f) \cdot dt_y = \\ &= m_a \cdot \delta_{ep} \cdot \frac{v_k^2 - v_n^2}{2} + \int_0^{t_y} v_a \cdot (f_r \cdot (1 + a_f \cdot v_a^2) \cdot m_a \cdot g + c_{ae} \cdot v_a^2) \cdot dt_y, \end{aligned} \quad (2.5)$$

Bu erda: a_f – avtomobil tezligi bo'yicha g'ildirakning g'ildirashiga qarshiligini inobatga oluvchi koeffitsient;

c_{ae} – suyurlik koeffitsienti, $c_{ae} = k \cdot F$, (N s²/m²);

F – avtomobilning old yuzasi (m²);

k – havoning qarshiligini inobatga oluvchi koeffitsient, (N s²/m⁴).

Avtomobil tezlanishini o'zgarmas deb qabul qilib

$j_a = \frac{dv_a}{dt_y}$ ($dt_y = \frac{dv_a}{j_a}$) (4) tenglamani v_a bo'yicha integrallaymiz:

$$E_{yck} = m_a \cdot \delta_{ep} \cdot \frac{v_k^2 - v_n^2}{2} + \int_{v_n}^{v_k} \frac{v_a \cdot (f_r \cdot (1 + a_f \cdot v_a^2) \cdot m_a \cdot g + c_{ae} \cdot v_a^2) \cdot dv_a}{j_a}, \quad (2.6)$$

t_y vaqt ichida boshlang'ich tezlikdan v_n oxirgi tezlikgacha v_k tezlanish uchun sarflangan ishning miqdori

$$E_{yck} = m_a \cdot \delta_{ep} \cdot \frac{v_k^2 - v_n^2}{2} + m_a \cdot g \cdot f_r \cdot \frac{v_k^2 - v_n^2}{2 \cdot J_a} + \frac{(c_{ae} + m_a \cdot g \cdot f_r \cdot a_f) \cdot (v_k^4 - v_n^4)}{4 \cdot J_a}, \quad (2.7)$$

Avtomobilning o'zgarmas tezlik bilan harakatlangan davridagi bajariladigan ish sarfi g'ildirakning g'ildirashi va aerodinamik qarshiliklarga sarflanadi. O'zgarmas tezlik bilan harakatlanish uchun kerakli bajarilgan ish E_{yem} miqdori

$$E_{yem} = (v_a \cdot f_r \cdot (1 + a_f \cdot v_a^2) \cdot m_a \cdot g + c_{ae} \cdot v_a^3) \cdot t_{yem}, \quad [\text{Дж}] \quad (2.8)$$

Bu yerda: v_a – o'zgarmas tezlik, (m/s);

t_{yem} – v_a harakatlanish vaqti, (s).

Avtomobilning sekinlanish rejimida harakatlanishi uchun

$$E_{зам} = m_a \cdot \delta_{ep} \cdot \frac{v_n^2 - v_k^2}{2}; \quad [\text{Дж}] \quad (2.9)$$

3, 4 va 5 - tenglamalardan kelib chiqqan holda harakat sikli uchun sarflangan ish miqdori quyidagi tenglik orqali aniqlanadi:

$$E_{ei} = E_{yck} + E_{yem} + E_{zam}; \quad [Дж\epsilon] \quad (2.10)$$

Yuqorida keltirilgan matematik tengliklar yordamida harakat siklarida avtomobillarning bajargan ish sarfini va avtomobillarning energiya samaradorligini aniqlash mumkin.

FOYDALANILGAN ADABIYOTLAR RO‘YXATI: (REFERENCES)

1. Axunov, J. A., & Tojiboyev, S. I. o‘g‘li. (2023). AVTOBUSLARDA YO‘LOVCHILAR TASHISHNI TASHKIL ETISH. GOLDEN BRAIN, 1(14), 91–93.
2. Axunov, J., & Tojiboyev, S. (2023). LOGISTIKA ORQALI MAHSULOTLARNI YETKAZIB BERISH TIZIMINI BOSHQARISH. Talqin va tadqiqotlar, 1(7).
3. Omonov, F. A. (2022). Formation and Analysis of Urban Passenger Traffic Control. Eurasian Journal of Research, Development and Innovation, 6, 6-13.
4. Fayziev, P. R., Tursunov, D. M., Khujamkulov, S., Ismandiyarov, A., & Abdubannopov, A. (2022). Overview of solar dryers for drying lumber and wood. American Journal Of Applied Science And Technology, 2(04), 47-57.
5. Oblayorovich, M. X., & Mukhamadbekovich, T. D. (2022). Analysis of the Impact of Hydraulic System Fluid Quality on the Efficient Operation of Universal-Type Tractors. Eurasian Research Bulletin, 6, 103-108.