

opportunity to optimize equipment acquisition and reduce the costs associated with fleet renewal.

The results confirm that the use of conditional entropy ensures optimisation of model series structure, elimination of redundant elements, and improvement of design and manufacturing processes. The proposed method can be applied to automobiles, tractors, and self-propelled chassis due to similarity of physical principles governing their dynamics and interaction with supporting surfaces. This is supported by modern studies on self-propelled chassis performance and autonomous ground vehicles [4, 5]. The approach also enables integration of experimental and statistical data into the formation of model series, improving reliability of parameter selection and supporting multi-parameter optimisation.

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ANALYSIS OF INTERNATIONAL EXPERIENCE IN ASSESSING COMPLIANCE WITH SAFETY REQUIREMENTS OF CHANGES MADE TO THE DESIGN OF A VEHICLE, INCLUDING THOSE IN OPERATION

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During vehicle operation, owners often need to modify the design by making changes to the vehicle's structure.

At the same time, in order to ensure road safety, it is necessary to ensure proper control and thereby not worsen the design requirements that were in force at the time of release into circulation.

UN regulations can be assessed not only by examining the wheeled vehicle using experimental instrumental measurement and testing methods, but also by expert or computational methods, including organoleptic analysis.

Therefore, it is advisable to involve duly accredited entities. For example, testing laboratories and/or inspection bodies.

Global practice in this area shows that ISO/IEC 17020 inspection bodies are often engaged, rather than ISO/IEC 17025 testing laboratories.

This is due to a significant difference: the former have the authority to issue a conclusion on the compliance of a given object with established requirements, while the latter do not. The test reports they issue are classified as technical documents and, in themselves, have no legal consequences for the release of products to the market.

Furthermore, based on positive reports, only the certification body has the authority to issue the final document in the form of a certificate of conformity, a declaration of conformity, or a chassis or vehicle type approval.

Thus, the inspection body can occupy a niche between the certification body and the testing laboratory, as its expert specialists can conduct tests when necessary and draw conclusions about compliance, including on the customer's equipment. For example, in Germany, Poland, and Turkey, inspection bodies (TÜV, DEKRA, etc.) perform technical inspections of vehicles.

When making changes to the design for these purposes, in world practice, competent specialists from expert organizations – testing laboratories and inspection bodies (TÜV, DEKRA, etc.) – are involved in the conformity assessment, accredited according to international standards ISO/IEC 17025 and 17020 by accreditation bodies (e.g., German – Deutsche Akkreditierungsstelle GmbH (DAkkS), British – United Kingdom Accreditation Service (UKAS), or Spanish – Entidad Nacional de Acreditacion (ENAC), recognized by the international laboratory accreditation organization - International Laboratory Accreditation Cooperation (ILAC).

Accredited persons carry out an individual inspection of a specific complete vehicle, as well as the necessary research using calibrated measuring instruments and certified software, by identifying the components used and carrying out a technical inspection.

The expert reports list all modifications made to the vehicle, using only approved components and positive technical inspection results.

Based on the documents received from the experts, which contain information on the assessment of the results of individual technical creativity, as well as the vehicle's modifications to comply with road safety requirements, vehicle owners contact the relevant authorities, who perform the registration procedures in the vehicle identification documents.

For example, in Germany, there is a network of independent organizations with over a century of history that deals with technical product inspection.

These are the technical inspection societies Technischer Überwachungsverein (TÜV) , which provide for the procedure for drawing up conclusions.

For example: a single permit, i.e. homologation according to § 21 Homologationen in the text “Regulations for the registration of vehicles for road traffic” Straßenverkehrs-Zulassungs-Ordnung (StVZO) (type examinations for approval for operation) for Europe, including for vehicles released for operation in the USA and Japan in accordance with Directives of the European Parliament 2007/46/EG, 2002/24/EG, 2003/37/EG and DIR 183/2011 (scope of activity of the Import and Export Services department (SIMEX)).

Also in Germany there is a procedure for registering tuning in accordance with § 19 Fahrzeugänderungen StVZO, dedicated to changes in the vehicle.

The TÜV certificate lists all changes made to the vehicle on TÜV approved components only.

This procedure provides for 30 types of design changes that require additional information to be included in the vehicle's registration documents – the vehicle's technical passport (Fahrzeugschein) – as well as 10 types that do not require such markings, in the case of the installation of easily removable equipment.

Ten conditions requiring supervision have also been formulated. For tuning enthusiasts, 23 types have been defined, along with procedures and required documents for registration. Technical inspections (mass inspections) in Germany are regulated by § 29 of the Reihenuntersuchungen StVZO [1].

International approval for the operation of wheeled vehicles is of the utmost importance in order to ensure maximum safety for all road users.

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ANALYSIS OF INDICATORS OF FUNCTIONAL STABILITY OF THE TRACTOR UNIT IN PLOWING MODE

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