



**MANAGING TECHNICAL SYSTEMS IN
MOTOR-TRANSPORT ENTERPRISES IN
UZBEKISTAN: A PROGRAMME-TARGET
APPROACH TO IMPROVING VEHICLE
TECHNICAL OPERATION AND SERVICE
QUALITY**

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***Abstract.** This article develops an academic overview of the didactic purpose, subject matter, and managerial logic of the course “Technical Systems Management” in the context of Uzbekistan’s education reforms. The analysis proceeds from the premise that the effectiveness of vehicle technical operation (maintenance and repair, reliability, and availability) is inseparable from how technical systems are managed in motor-transport enterprises. Building on a programme-target (program-goal) approach, the article conceptualises technical management as a cyclic decision-making technology: goal formulation, data acquisition, information validation, analytical diagnosis, selection among alternatives under resource constraints, formalisation of decisions, communication, implementation, monitoring, and corrective feedback. Particular emphasis is placed on the systemic composition of technical systems—rolling stock, equipment, ICT tools, and human resources—and on typical organisational bottlenecks that generate downtime, wasted labour, and excess material consumption. The article concludes that market-integrated technical management requires measurable performance indicators, clarified responsibilities, standardised*

information flows, and continuous improvement mechanisms aligned with service quality and cost efficiency.

Keywords: *technical systems management; vehicle technical operation; motor-transport enterprise; programme-target approach; maintenance and repair (M&R); decision-making cycle; performance indicators; information flows; organisational efficiency; service cost reduction*

Introduction

Uzbekistan's education policy has historically treated the adoption of the Law "On Education" and the National Programme for Personnel Training as foundational instruments for reforming the education system, defining the goals, tasks, and directions of human capital development¹. In this framework, the second stage of the National Programme has been widely interpreted as a quality-oriented stage, placing the planning and delivery quality of learning activities at the centre of professional training outcomes².

Within engineering and transport education, the course "Technical Systems Management" plays a key role in translating these policy aims into operational competences—especially for specialists working in motor-transport enterprises (MTEs), where service quality depends on the reliability and readiness of rolling stock and on the efficiency of maintenance and repair systems.

The legal-policy foundation relevant to this article includes:

¹ Republic of Uzbekistan. (1997). Law "On Education" (No. 464-I, 29 August 1997).

² Republic of Uzbekistan. (1997). National Programme for Personnel Training (No. 463-I, 29 August 1997).

- the 1997 Law “On Education” and the 1997 National Programme for Personnel Training (adopted as part of a major reform package)³,
- and the renewed Law “On Education” adopted in 2020 (O‘RQ-637), reflecting further system modernisation and updated governance principles.

From a didactic perspective, the key implication is straightforward: quality of personnel training is directly connected to how well educational content equips learners to plan, organise, and manage real technical processes—particularly under market conditions, where customer demand, cost discipline, and service standards are decisive.

The object of the course is the technical management of systems within motor-transport enterprises, including enterprises of different profiles and scales (fleets, workshops, service units).

The subject matter focuses on:

- development and modernisation of technical systems,
- raising management efficiency,
- improving the effectiveness of vehicle technical operation by managerial methods grounded in engineering analysis.

The didactic purpose is to form the ability to:

1. evaluate factors influencing technical operation outcomes quantitatively;
2. choose technically justified solutions under constraints (resources, conditions, alternative options);
3. connect technical decisions to economic performance and market requirements.

³ Kuznetsov, E. S. (Ed.). (2004). Technical Operation of Automobiles: University Textbook. Moscow: Nauka.

A central methodological thesis is that the efficiency problem in vehicle technical operation should be addressed through a programme-target approach. In this logic:

- the “problem” is not only a technical failure or a shortage of resources,
- but a system of interacting factors requiring measurable objectives, structured alternatives, and prioritised interventions.

This approach requires:

- identifying performance indicators (availability/readiness, downtime, failure frequency, repair duration, resource consumption),
- assessing the influence of internal and external factors,
- selecting a course of action that maximises the target criterion under constraints.

Technical systems, as treated in the course, include four interrelated components:

1. Rolling stock (freight and passenger vehicles).
2. Technical means (machines, tools, workshop equipment).
3. ICT and communication tools (computers, data systems, dispatch tools).
4. Human resources (drivers, mechanics, shop supervisors, production staff).

From a systems view, the “private” (applied) concept of the discipline is to increase the competitiveness of system participants, ensure market-oriented development of transport services, and reduce the unit cost of transportation, maintenance, and repair through rational organisation and motivated coordination.

Management is defined as a purposeful process that transforms a system from an initial state to a desired state based on information about system condition and external factors. The programme-target model can be operationalised through a structured decision cycle:

1. Define goals of the system/subsystem (enterprise, workshop, unit).
2. Collect information about system condition and external factors (demand, operating conditions, supply chain constraints).
3. Process and validate information (accuracy, completeness, reliability).
4. Analyse and diagnose; if needed, gather additional data and conduct expert review.
5. Make a management decision consistent with goals and evidence (select a development path among alternatives).
6. Formalise the decision (clear responsibilities, normative format, measurable milestones).
7. Communicate the decision to implementers in a manner that prevents ambiguous interpretation.
8. Implement (e.g., improve maintenance norms and systems; upgrade facilities; introduce incentives; decide on repair vs decommissioning).
9. Obtain feedback information about the new system state.
10. Correct goals and methods if full achievement is not reached; diagnose causes and adjust strategies.

This cycle highlights a crucial professional competence: management decisions must be engineering-justified, not merely administrative.

The underlying text emphasises that many MTEs experience inefficiencies in the use of production resources (space, equipment, spare parts, materials, labour). These inefficiencies generate:

- reduced technical readiness of rolling stock,
- growth of labour and material costs,
- avoidable vehicle downtime.

A key organisational problem is the overlap of responsibilities and unclear boundaries of duties across management levels, which leads to unbalanced workloads, excessive attention to minor issues, and non-productive labour time.

The text cites empirical observations where unproductive time losses can be substantial (e.g., around 45% of working time fund in certain repair contexts), with major shares associated with poor planning and control, inefficient use of tools/equipment, and time spent on obtaining parts and completing paperwork. In programme-target terms, these are not isolated “discipline problems” but symptoms of weak process governance, fragmented information flows, and the absence of operational performance control.

The course perspective explicitly connects technical management with market requirements: modern management must be integrated with demand, service expectations, and cost discipline.

In practice, this implies:

- shifting from reactive repair to preventive and data-informed maintenance scheduling,
- developing measurable KPI systems (availability, downtime, turnaround time, defect recurrence, unit service cost),

- standardising information exchange and reducing non-productive paperwork time,

- strengthening motivation mechanisms that align individual performance with system goals.

Thus, the programme-target approach functions as a bridge between engineering logic (reliability and readiness) and economic logic (cost and competitiveness).

Conclusion: The analysis demonstrates that “Technical Systems Management” is not an auxiliary discipline but a core competence-forming field for transport engineers and managers. Under Uzbekistan’s quality-oriented education reforms, the course provides a structured methodology for improving vehicle technical operation through a programme-target approach. Technical systems in motor-transport enterprises must be managed as integrated socio-technical complexes that combine equipment, rolling stock, information tools, and human resources. The proposed ten-step management cycle clarifies how to translate goals into measurable decisions, implementation, monitoring, and corrective learning. The article concludes that sustainable improvements in service quality and cost efficiency require: clarified organisational responsibilities; (2) standardised and reliable information flows; (3) performance indicators tied to readiness, downtime, and unit costs; and (4) continuous process improvement aligned with market demand. In this way, technical management becomes a practical instrument for strengthening competitiveness and ensuring the reliability of transport services.

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