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Project Title: Review of Regulation No. 614 Titled Technical and Executive Specifications of Road Lighting.

Department:	Power Systems Operation and Planning	Employer:	Plan and Budget Organization
Project/Program Manager:	Niki Moslemi	Executor:	Niki Moslemi
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Project Staff:

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Keywords:

Lighting, Road Surface, Tunnels, Measurements, Lamps, Lanterns, Light Pollution, Air Signs, Solar Energy, Control.

Project Necessity:

As the number of motor vehicles and pedestrians on the roads is increasing day by day, ensuring proper lighting of the roads is essential. Adequate road lighting is crucial for road safety as it not only provides sufficient visibility for drivers but also enhances visibility for pedestrians, reduces crimes and accidents, facilitates easier navigation, and creates a secure environment for commuting. The lack of lighting in sections of roads that require it can lead to more severe accidents, reduced road capacity, and increased criminal activities. It is important to note that due to cost constraints, energy consumption, environmental concerns, and natural resources, it is not feasible to illuminate all roads along their entire length. Therefore, identifying the roads that need lighting, determining the level of lighting required, and planning the lighting system require extensive studies and engineering. Proper lighting design tailored to the specific needs of different road classifications, streets, and pathways, determining the necessary light levels, selecting appropriate types of lights based on required light distribution, determining the installation height of lights, and specifying the layout and distances for installing light poles are crucial considerations in road lighting design.

Journal number 614 (replacing journal number 195) encompasses the specifications, regulations, and technical instructions necessary for the design, measurement, and implementation of various lighting systems for different types of roads. This journal not only includes guidelines for lighting placement on rural roads but also covers the design and measurement of lighting in urban streets, intersections, bridges, special vehicle and pedestrian crossings, and more. In recent years, the emergence and utilization of new technologies such as LED lamps have brought significant and noticeable changes in providing roadway lighting with lower power consumption. This necessitates the preparation and revision of new regulations and a review of the previous journal consisting of new design, measurement, and implementation methods for modern lighting systems for

various types of roads more than ever before. Furthermore, over the past 10 years and in comparison to the time of drafting journal 614 (year 1392 in the Persian calendar), significant changes have been made in lighting standards. Therefore, it is essential to update the principles, requirements, and technical specifications outlined in the aforementioned journal, which were based on the standards of that time, and utilize the new journal.

Project Goals:

According to the prepared journal, the following objectives have been achieved in the project:

- 1- Ensuring the safety of the country's roads at different times of the day and night
- 2- Establishing a unified procedure for designing street lighting in the country
- 3- Reducing electricity consumption in street lighting by utilizing new technologies such as LED lamps and modern control systems
- 4- Reducing accidents on the country's roads
- 5- Increasing the capacity of the country's roads
- 6- Reducing light pollution in the country
- 7- Preserving the environment and natural and animal resources in the country
- 8- Determining the method of recycling lamps and equipment used in the street lighting sector in the country
- 9- Managing the load of street lighting during night peak hours
- 10- Using renewable resources to light up streets and roads in the country
- 11- Synchronizing internal standards and guidelines with international standards
- 12- Saving costs and time related to the design and implementation of street lighting systems

Abstract:

The Technical and Executive System of the country (approved under the number 42339/T33497, dated 20/4/1385 by the Council of Ministers) emphasizes the utilization of technical standards, norms, and general regulations in the stages of preparing and implementing projects, as well as the necessary attention to maintenance and operating costs in the total price of the projects. This matter is firmly confirmed based on Article 23 of the Law on Planning and Budgeting and the Technical Executive System of the country, which assigns the responsibility of preparing and formulating technical regulations and standards for the country's development projects.

The present regulation titled "Road Lighting Regulations" is a publication that has been revised, reviewed, and completed by the Power Research Institute in line with the aforementioned goals. Supervision of this regulation has been carried out by the consulting engineering company Rahyab Mella. It is worth mentioning that this publication replaces publication number 614 titled "General and Executive Technical Specifications for Road Lighting," which was prepared in collaboration with the Power Research Institute in 2013.

This publication consists of sixteen chapters. The first chapter covers definitions and terms, the second chapter addresses general design regulations for lighting, the third chapter focuses on road surface coverage and its impact on lighting, the fourth chapter discusses the conditions and requirements for providing road lighting, the fifth chapter deals with tunnel lighting, the sixth chapter provides general safety recommendations and maintenance of road lighting systems, and the seventh chapter is dedicated to the guidelines for measuring lighting in roads. Chapters eight to sixteen respectively cover the technical specifications of equipment used in road lighting, light and lamp photometry, distribution system and power supply to the network, light pollution, lighting of specific road sections, lighting of road signs, solar-powered road lighting systems, lighting control systems, and the recycling of lamps containing mercury and LED. Finally, the sources and references used in the regulation will be introduced.

Steps and Methodologies:

First stage: Extraction and compilation of definitions, concepts, criteria, calculations, and general regulations for designing street lighting.

Second stage: Extraction and compilation of principles and regulations for designing street lighting for different roads.

Third stage: Extraction and compilation of regulations, safety regulations, and maintenance guidelines for street lighting systems.

Fourth stage: Extraction and compilation of guidelines for measuring street lighting in roads.

Fifth stage: Extraction and compilation of technical specifications for equipment used in street lighting.

Sixth stage: Extraction and compilation of technical specifications for the distribution and power supply system to the street lighting network.

Seventh stage: Extraction and compilation of principles and regulations for locating street lighting in suburban areas and preparing a technical brochure.

Main Results (technical outputs, patents, papers, books, reports, etc.):

- 1- Journal 614-800 titled "Road Lighting Regulations"
- 2- Article titled "Detailed Design of Solar Lighting Systems" presented at the Ninth International Conference on Mechanical, Electrical, and Computer Engineering in Iran
- 3- Article titled "A Comparative Study of Different Road Lighting Control Systems" presented at the Ninth International Conference on Mechanical, Electrical, and Computer Engineering in Iran