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Creation of Attributive Data of Thematic Structures of the State Cadastre of Motor Roads

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Abstract: According to the "Categories of the road network," the objects of roads create attribute data for the stratigraphic levels of the state cadastre based on their legal, economic, and construction status.

Keywords: Cadastre, object, road, quantity, quality, assessment, report, information, network, category, legal, technical, record, construction, highway, attribute, layer, map, street, highway, pedestrian.

Introduction: According to theState Cadastre of Motor Roads (SCMR) in accordance with the Laws of the Republic of Uzbekistan "On State Cadastres", "On Motor Roads" [1,2] and the Resolution of the Cabinet of Ministers of June 30, 2005 No 152 as well as in accordance with the Regulations on the procedure for maintaining the state cadastre of roads, the state cadastre provides for the registration, registration, evaluation of road facilities and provides for the mandatory use of cadastral information and the state cadastre of buildings and structures. [3].

Existing and under construction roads, specific facilities for their maintenance, and other road facilities in the Republic of Uzbekistan are referred to as SCMR facilities [3].

The Cadastre Agency's priority is to create an up-to-date, reliable information system on road facilities, their geographical location, legal status, quantitative and qualitative characteristics, and economic assessment, as well as to provide relevant information for inclusion in the Unified System of State Cadastres, which provides users with cadastral information [3,4].

Research methodology and methods. The goal of this research is to create a technique for creating attributive data on the thematic levels of the state cadastre of roads in the Samarkand region's Ishtikhon district.

The subject of the study is "General view of highways" and "Highways", "Artificial structures", "Regulation and equipment facilities", "Road intersections and junctions", which form the thematic layers of the state cadastre of highways [5]. Development of a procedure for creating attribute data of the thematic layers "Protective structures" and "Buildings" according to "Street network categories", on the basis of their legal, economic and construction status.

The research process used legal, statistical analysis, grouping, systematization, and statistical re-examination of the reliability of the results.

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Reliability and discussion of research results.

State registration of property rights and other rights to road facilities, accounting for quantitative and qualitative characteristics, quality and value assessment, classification, storage, and updating of cadastral information, providing relevant information for inclusion in the Unified State Cadastre providing cadastral information

This is where the concept of attribute data comes in handy. The attributive database contains all information about the highway's objects, including their purpose, total length and width, land occupied, area of service buildings and special facilities, owners, users, geographical location, legal status, quantitative characteristics and assessment, as well as current changes in condition, materials used, year of construction, and commissioning date.

The creation of attributive data of all types of thematic layers of roads, as described in the map-scheme of roads of Ishtikhon district of Samarkand region (Figure 1), compilation of reports on the status of their legal, economic, and construction status, and cadastral information is calculated as one of the main indicators of economic development of the district.

Figure 1.

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When creating attributive data of thematic layers on the state cadastre of highways on "Categories of the road network" on categorization of "Street network" and their location, quantity and quality, technical condition, level of improvement and value and change of these indicators information retrieval.

The road network is a specially constructed engineering structure [6] that provides pedestrian traffic, ie the movement of goods from one place to another, and we divide them into categories in Table 1 according to the purpose of use and the width of the carriageway:

Categorization of "street-road network"

Table 1.

№	Street-road categories	Road width, m	Number of lanes in both directions
1	**Highways:**	80-140	6
	Level 1-2 national and interstate highways		
	Level 3 national and regional highways	45-80	4
	Highways of district level 4-5	35-60	4
2	**City-wide highways:**		
	In constant motion;	4.5-7.5	6
	Movement controlled.	4.5-7.5	4
	Roads for freight traffic	4.5-7.5	2
3	**Streets and roads of local importance:**		
	Residential streets;	3-6	2
	Roads in industrial zones;	4.5-7.5	2
	The streets of the village	3.5-7.5	2
	Pedestrian paths	1-2	2
	Coastal streets	By type of water basin	
4	**Tramways**	7-10	2

Specialized geographic information system (USSCGIS) designed to solve the problems of the Unified System of State Cadastres on the basis of a computer database, taking into account the attribute data of the thematic layers of the State Cadastre of Motor Roads on "Categories of Street and Road Network", representing their legal, economic and construction status), i.e., to ensure the integration of thematic cadastral information into a single geo-spatial database, we form their attribute data (Figure 2).
In this case, the location of roads, their ownership or other property rights of legal entities and individuals, the grounds and terms of these rights, the period of their suspension, the conditions of restriction of property rights and other property rights, state registration, protected areas information on the legal status of highways.

The economic status of roads is formed by the value of roads and their technical condition and the state of repair, their type and administrative affiliation to higher authorities, and other information on the purpose of their use.

Compliance of roads with land use schemes, master plans of cities, settlement projects, as well as the requirements of urban planning norms and regulations, parameters of roads (total length, width-total and carriageway, number of lanes) and material types of carriageway, the status of construction of highways is the location of the land plot, the date of construction, the availability of engineering and technical facilities, information on road maintenance facilities and other technical information.

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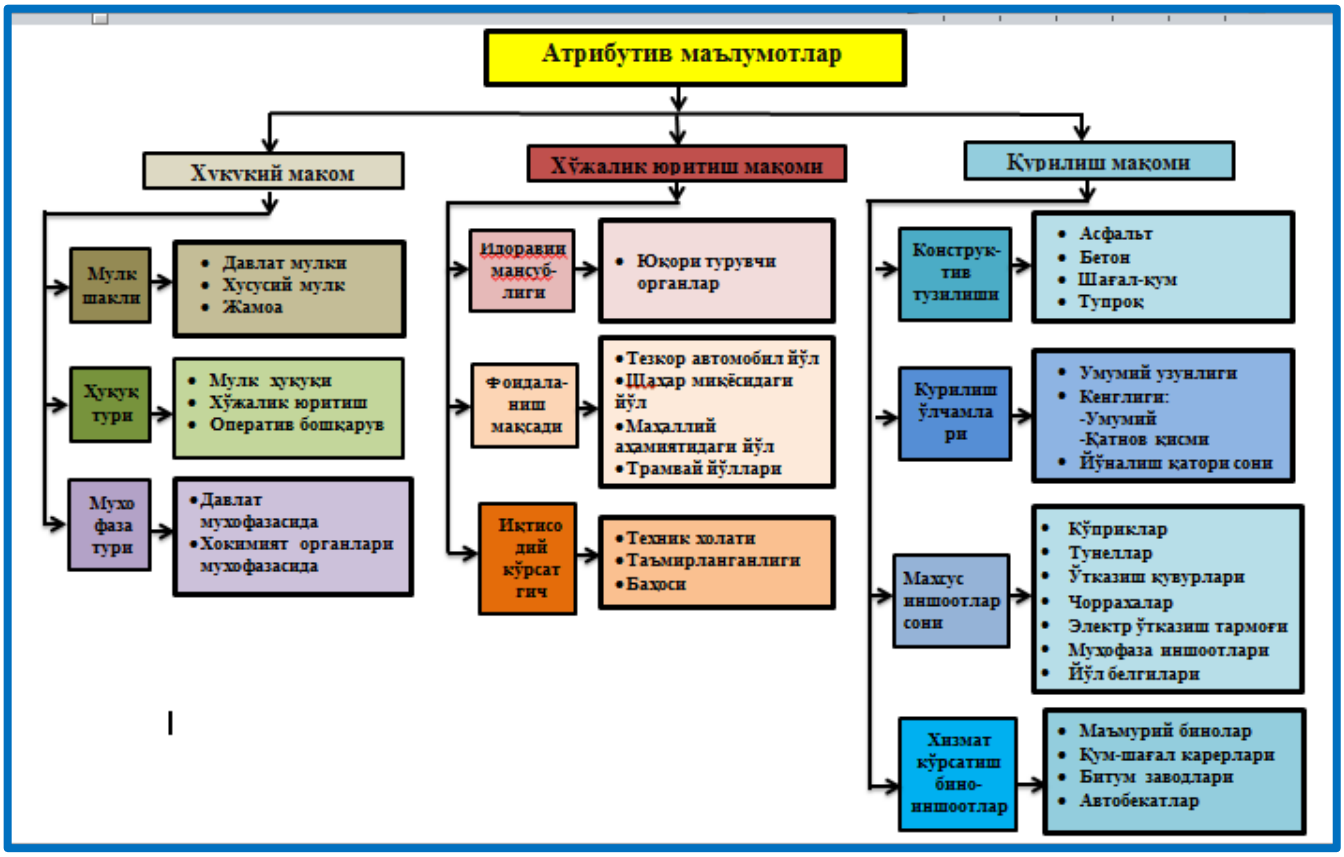

Figure 2. Composition of attributive data of thematic layers on the state cadastre of objects of highways

In the formation of this data, the attribute in the GIS database is one of the main forms of data representation. Attributes that display the properties of the object and correspond to the thematic view of the data are stored in a tabular view. In this case, when each object is placed in rows, their attribute data is placed in columns (Figure 3).

Fig. 3. Formation of attribute data of thematic layers on the state cadastre of highways

Attribtive data		
1.	**Legal status**	
1.01	**Name of highway and service and special facilities and structures:**	
1.01.1	Common roads View "and" Highways "	*4r-48 "Zarafshan tract" (bucket-Mitan-Ishtikhan) Homeland*
1.01.2	«Artificial structures»	-
1.01.3	«Objects of arrangement and equipping»	-
1.01.4	«Roads and connections»	-
1.01.5	«Protective facilities»	-
1.01.6	«Buildings and structures»	*Administrative building of Ishtikhon District Use Enterprise*
1.02	**Form of ownership**	*State property*
1.03	**Type of law for the road**	*Farm*
1.04	**Type of right of land plot**	*Continuous use*
1.05	**Area of the land plot of the road and its maintenance and special buildings-**	

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	structures (actual, protected area, unauthorized), ha:	
1.05.1	Common roads View "and" Highways "	465000;
1.05.2	«Artificial structures»	-
1.05.3	«Objects of arrangement and equipping»	-
1.05.4	«Roads and connections»	-
1.05.5	«Protective structures»	-
1.05.6	«Buildings»	0,58
1.06	**When and by whom the document confirming the right was issued**	*Resolution of the khokim of Ishtikhon district of Samarkand region No. 236 of December 26, 1999*
1.07	**State registration of the road and its maintenance, as well as special buildings and structures:**	
1.07.1	"General view of highways" and "Highways"	*18.02.2015 ŭ№ 263-376-188* *SM 0269385*
1.07.2	«Artificial structures»	-
1.07.3	«Regulation and equipment facilities»	-
1.07.4	«Road intersections and junctions»	-
1.07.5	«Protective structures»	-
1.07.6	«Buildings»	*18.02.2015 ŭ№ 264-377-189* *SM 0269386*
1.08	**Cadastral number of the road and its maintenance, as well as special buildings and structures:**	
1.08.1	"General view of highways" and "Highways"	*14:16:01:02:003*
1.08.2	«Artificial structures»	-
1.08.3	«Regulation and equipment facilities»	-
1.08.4	«Road intersections and junctions»	-
1.08.5	«Protective structures»	-
1.08.6	«Buildings»	*14:16:01:02:003:001*
1.09	**Protected area system**	*Under the protection of local authorities*
1.10	**Easement information**	*Not specified*
1.11	**Information on restriction and prohibition of the right**	*Not specified*
1.12	**Information on the lease of the protected area**	*Not for rent*
1.13	**Cadastral plan**	*M.1:2000*
1.14	**Address of the highway and its maintenance, as well as special buildings and structures:**	
1.14.1	"General view of highways" and "Highways"	*The territory of Ishtikhon district of Samarkand region*
1.14.2	«Artificial structures»	*The territory of Ishtikhon district of Samarkand region*
1.14.3	«Regulation and equipment facilities»	*The territory of Ishtikhon district of Samarkand region*
1.14.4	«Road intersections and junctions»	*The territory of Ishtikhon district of*

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		Samarkand region
1.14.5	«Protective structures»	*The territory of Akhunboboev rural citizens' counsel of Ishtikhon district of Samarkand region*
1.14.6	«Buildings»	*Istiqlol street 15, Ishtikhon city, Samarkand region*
2.	**Business status**	
2.01	**Name and address of the legal entity or individual who is the owner, possessor, user or lessee of the highway and its maintenance, as well as special buildings and structures:**	
2.01.1	«General view of highways »and« Highways»	*Ishtikhon district road maintenance company*
2.01.2	«Artificial structures»	*Ishtikhon district road maintenance company*
2.01.3	«Regulation and equipment facilities»	*Ishtikhon district road maintenance company*
2.01.4	«Road intersections and junctions»	*Ishtikhon district road maintenance company*
2.01.5	«Protective structures»	*Ishtikhon district road maintenance company*
2.01.6	«Buildings»	*Ishtikhon district road maintenance company*
2.02	**Departmental affiliation of the road and its maintenance, as well as special buildings and structures:**	
2.01.1	«General view of highways »and« Highways»	*Uzavtoyol SJSC Samarkand Regional Main Department of Motor Roads*
2.01.2	«Artificial structures»	*Uzavtoyol SJSC Samarkand Regional Main Department of Motor Roads*
2.01.3	«Regulation and equipment facilities»	*Uzavtoyol SJSC Samarkand Regional Main Department of Motor Roads*
2.01.4	«Road intersections and junctions»	*Uzavtoyol SJSC Samarkand Regional Main Department of Motor Roads*
2.01.5	«Protective structures»	*Uzavtoyol SJSC Samarkand Regional Main Department of Motor Roads*
2.01.6	«Buildings»	*Uzavtoyol SJSC Samarkand Regional Main Department of Motor Roads*
2.03	**Purpose (category, type) of the road and its maintenance and use of special buildings and structures:**	
2.01.1	«General view of highways »and« Highways»	*Ўзбекистон Республикасининг давлат аҳамиятига молик автомобиль йўли*
2.01.2	«Artificial structures»	*Автомобиль йўлидан фойдаланишда хизмат кўрсатиш*
2.01.3	«Тартибга келтириш ва жиҳозлаш объектлари»	*Road Service*
2.01.4	«Road intersections and junctions»	*Road Service*
2.01.5	«Protective structures»	*Road Service*
2.01.6	«Building»	*Road Service*
2.04	**Road traffic indicator**	*More than 7,000 per day*
2.05	**Technical condition of the road and its maintenance, as well as special buildings and structures (good, satisfactory, bad, in an emergency condition, physical obsolescence):**	
2.01.1	"General view of highways" and	*Available (satisfactory)*

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	"Highways"	
2.01.2	«Artificial structures»	*Available (satisfactory)*
2.01.3	«Facilities of regulation and equipment»	*Available (satisfactory)*
2.01.4	"Road intersections and junctions"	*Available (satisfactory)*
2.01.5	«Protective structures»	*Available (satisfactory)*
2.01.6	«Buildings»	*Available (satisfactory)*
2.06	**Year of repair of the road and its maintenance, as well as special buildings and structures, funds (billion soums), book value (billion soums):**	
2.01.1	"General view of highways" and "Highways"	*2012; 1,2; 5.2:*
2.01.2	«Artificial structures»	-
2.01.3	«Facilities of regulation and equipment»	-
2.01.4	"Road intersections and junctions"	*2012 ; 0,2;*
2.01.5	«Protective structures»	-
2.01.6	«Buildings»	*2012; 0, 36; 0,64;*
2.07	**Total price, thousand soums:**	*32.4*
	hence, the value of the plot,	*5,4*
3.	**Construction status**	
3.01	**Construction of the carriageway**	*Asphalt*
3.02	**Total length of the road, km**	*30*
3.03	**Width of road, m:**	
3.03.1	In general	*12*
3.03.2	part of travel	*4.5x2=9*
3.04	**Number of routes**	*2 raws*
3.05	**Protected area size, m.**	*38x2=76*
3.06	**Date and serial number of the document on the protected area**	*Resolution of the khokim of Ishtikhon district of Samarkand region No. 236 of December 26, 1999*
3.07	**Number, material, dimensions, cost of the road and its special facilities (thousand soums):**	
3.07.1	Bridges	*1 ma;in Pk16+22 K-TB* $\frac{15x12-2x2}{35}4$
3.07.2	Tunnel, tunnel-bridge	*1 ma; in Pk24+52 T- B* $\frac{14-2x4}{93}3$; *1 ma; in Pk38+84 TK* $\frac{14-2x4}{30}4\frac{30-2x6}{14}60B$
3.07.3	Crossroads, railway	$Pk15+42$ *ва ….. ða Chk* $\frac{8-2}{12}1TB$ *Pk35+38 ва .....*
3.07.4	Water pipes	*In CQ-Pk15+42; Pk28+76; Pk46+36* $3\frac{8}{2000}B$; $CQ\ Pk36+80\ 1\frac{8}{1000}B$
3.07.5	Power transmission line	$ETPk32+65\ 3\frac{8}{1000}4$

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3.07.6	Security structures	*3 rows of avalanche protection trees at Pk32 + 78, length 220 m*
3.07.7	Road signs	*Number of road signs, 163 in total, including: ordering - 58, prohibiting - 36, indicating - 43, etc. - 26*
3.08	**Highway and its maintenance buildings:**	
3.08.1	Administrative buildings	*Administrative and economic buildings of Ishtikhon district road maintenance enterprise*
3.08.2	Sand-gravel quarries	*Mitan sand-gravel production quarry*
3.08.3	Bitumen plants	*Asphalt plant of Mitan TYXPTFK with a capacity of 20 tons / hour*
3.08.4	Bus stops	*2, width - 10 m., Height - 20 m., Land area - 200 sq.m..,*

Here:

- Pk16+22 да К-$TB\frac{15x12-2x2}{35}4$ *(K-bridge at Pk16 + 22 of the highway, material: TB - reinforced concrete, length 15 m, width length - 12 m, direction - 2, row - 2, load capacity - 35 tons, height - 4 m);*
- Pk24 + 52 in Tunnel T-B$\frac{14-2x4}{93}3$*(Pk24 + 52 daT-tunnel of the highway, material: B- concrete, m, width length-14 m, route-2, row-4, height -93 m, height-3 m);*
- in Pk38 + 84 Tunnel-bridge TK$\frac{14-2x4}{30}4\frac{30-2x6}{14}60B$*(TK-tunnel-bridge on Pk38 + 84 highway, tunnel section: width length-14 m, direction of travel-2, row-4, height-30 m, height-4 m, bridge section: width length-30 m, direction of travel-2, row-6, height length 14 m, load-carrying-60 tons, material-B concrete)*
- Number of intersections$\text{Pk}15+42;\ \text{Chk}\frac{8-2}{12}1\text{TB}$; (Chk-intersection-8 at Pk15 + 42 and ..... of the highway, 2 of them at traffic lights, Pk35 + 38 and ..... at Cht-connecting intersection-12, Pk-48 + 12 at 1 rail crossing, B-controlled or H-unprotected);
- Pk-15+42; Pk-28+76; Pk-46+36-CQ-watersupply pipes CQ $3\frac{8}{2000}\text{B}$(CQ-water pipe, a total of 4, of which 3: length-8 m, diameter-2000 mm, material B-concrete; CQ $1\frac{8}{1000}\text{B}$1st: length-8 m, diameter-1000 mm, material B-concrete;
- Power supply at $\text{Pk}32\ +\ 65\ \text{Et}-3\frac{8}{1000}4$ (On the highway Pk32 + 65 Et-electric network, number of wires - *3, length of wires - 8 m, voltage - 1000 kW, height - 4 m);*

Attributive data of thematic layers on the state cadastre of objects of the state highways according to "Street network categories",on the basis of indicators of their legal, economic and construction status (Figure 3) to provide them with reliable cadastral information on state and public authorities, interested legal entities and individuals on road facilitiesand the authorized body to the Unified System of State Cadastres annually in April submits the thematic layers of each of the road facilities in the region[5].

Conclusion: On the basis of the conducted research, opportunities will be created for the positive solution of the following issues:

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- ✓ Control over the collection of registration data of state cadastral objects of highways;
- ✓ Ensures the introduction and availability of an automated information system of the state cadastre of roads;
- ✓ Development of the structure of the database, its transfer to road enterprises, control over the correct completion of the database;
- ✓ organization of training of cadastral employees of regional subsidiary road construction organizations to work with the automated information system of the state cadastre of roads;
- ✓ Systematization of cadastral information provided by regional subsidiary road construction organizations and its inclusion in the automated information system of the state cadastre of roads;
- ✓ control over the collection of identification and evaluation data on new road facilities;
- ✓ Determining the compliance of the projects of the protection zone of road facilities with the requirements of urban planning and design documentation, as well as land management, construction, land reclamation, economic and other works for the maintenance of road facilities;
- ✓ Generalization and systematization of attributive data of thematic layers of road facilities in the territory of the region as of April each year and submission to the National Geographic Information System aimed at a single system of state cadastres and integration of state cadastres.

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