

THE EVALUTION METHODOLOGY RESISTANCE OF ASPHALT COVER OF THE AIRPORT MOVEMENT AREA

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The content of the thesis is to characterize the main factors and the factors affecting the planning, design and construction of asphalt pavements. In this work the focus is on the area of travel congestion of asphalt airfields and features of materials used for the construction of airport movement areas. Defined is the impact of travel congestion and weather conditions on the entire carrying capacity of the asphalt road. On a model example is described technique and evaluation methodics of resistance of the asphalt airport movement areas.

K e y w o r d s: planning, sizing, congestion, airport movement area,

1 INTRODUCTION

Air service must be safe not only during the flight time, but also on the ground communications of the airport. Development of road the construction and later the construction of airports required increasing assistance in issues like characteristics of soils and their behavior in natural travel lanes, subsoil of road and airfield pavements, soils in the construction process and the own soil, also in the area of traffic congestion, weather conditions, conditions in the subsoil and performance of road building materials behavior on the roads and finally issues of amplification of the roads and road management.

Design for airport movement area considers all relevant factors affecting the behavior, design and construction of the airport road, including the changes during its lifetime. These are mainly technical factors such as soil suitability and impact of climate conditions, then technical and organizational factors such as the possibility of obtaining the considered road construction materials and do not forget the socio-economic factors such as the protection of the environment. Equally essential part of the design of the airport movement area is optimization of movement area design in terms of mechanics, i.e. its thickness, the quality and design of load-bearing layers.

The design of construction itself cannot be done without a series of tests and calculations. For the determination of the carrying capacity of the airport road is used the CBR method by which we determine the resistance for each movement area at the airport. As the calculation method is used the Dornii method, based on the data of the aircraft design, which will be for the airport movement area critical

2 GENERAL INFORMATION

Most of the world of paved roads are covered with asphalt, which provides good performance and durability for the most trafficked conditions. Asphalt mixtures are also widely used in the construction of parking areas for both personal as well as for freight. Are therefore very suitable for use in building and refinishing access roads, perimeter roads and vehicle parking areas at airports.

Asphalt gives good performance and durability in a wide range of climatic and traffic conditions. Increasingly bitumen used in industrial areas, or for specific applications as the basis for railway tracks. Asphalt is also widely used in construction at the airport, although this use is not always recognized.

Design of structures airport movement area is the general name for several activities and has a broader meaning than simply sizing pavement for roads. Under the dimensioning of structures we mean calculating frame dimensions complying with the terms of carrying capacity, respectively resistance to achieving the same limit state. When designing the road needs to be done first proposal itself pavement, do calculations to assess the response burden and pavement using criteria, taking into account the conditions of action. Given the importance of the first stage, i.e., The structural design of the road itself, the term *zaužíval* designing roads, using the design method.

In the design of this type of airport communications must consider a range of factors which influence the selection of the type of road and the track.

Among the technical factors we can include the required operational performance of the road climatic conditions at the place of construction, engineering- geological conditions in soil properties and road construction materials.

The technical and organizational factors advise the technological possibilities of building an organization that is a supplier of construction work, the possibilities of the considered road construction materials and technological demands on transport.

Between socio-economic factors include environmental protection, use of local materials and waste, energy demand sourcing and execution of construction works, investment and production costs and total cost of construction, operation, maintenance and rehabilitation of the road.

Required operating performance may be declared *reps* load the design aircraft for the entire lifetime, or current intensity, the actual composition of the traffic flow, the challenging factor and the length of the design period.

Climatic conditions, be given such characteristics, which can be derived from the design temperature bituminous layers.

For the selection of the type and design of the road track we need to know the type and condition of the soil in the subsoil future embankments, soil type and condition of the soil,

Other details you need to know is the level of ground water along the route. From the properties of soils is important capillary wicking, thermal conductivity.

2.1. Systemic progression

Input data are the design factors that have a major influence on the properties of the road. It is the traffic load to be characterized in terms of dimensioning of road constructions. Basement of the road, the load bearing capacity depends on the type of soil and its condition (humidity and volume weight, degree of compaction).

Performance of building materials that affect the capacity and lifetime of structures: deformation and strength properties, fatigue and thermal-technical properties.

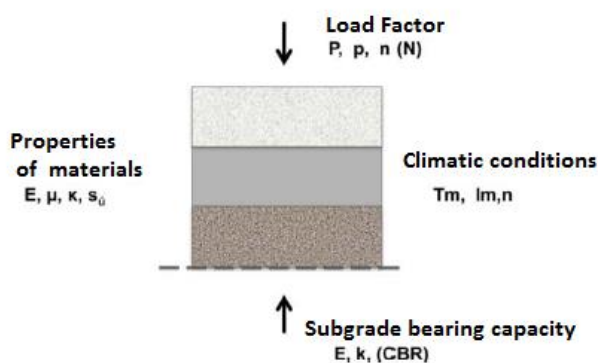


Figure 1 The main factors affecting the airport road

Climatic conditions that affect the properties of materials, but also the overall behavior of the structure: air temperature and its changes, temperature asphalt layers, temperature gradients, conditions in winter, and water resources in the subsoil of the road.

2.2 General considerations

Without a hard surface, can be a difficult access to the airport, flying may be limited due to bad weather and equipment shall not exceed the minimum standards required by regulatory authorities for the protection of passengers. On the classic airport require a solid surface:

- Runways,
- taxiways providing access to the track;
- parking areas for aircraft, Aprons,
- communication service,
- access roads.

In each of these areas it is necessary to apply different considerations. For example, runways require good resistance to shear and surface water drainage for good braking to prevent aquaplaning is important, even surface regularity to ensure passenger comfort and minimal risk of damage to delicate electronic components and corresponding load from high strength landing aircraft. At airports where flying jets, it is important to avoid damage to the engine due to flying loose particles from surface treatment pathways.

For aircraft parking areas is a major requirement for sufficient stability at high loads printed; on paved surfaces, where the aircraft will be handled by. Substantial is also good resistance to oil soaked and spilled fuel.

Asphalt mixtures can be very useful for some of these applications, but less appropriate for others. Proprietary surfaces have been developed for situations where it is likely that the traditional asphalt is inappropriate. Suitable alternatives were developed cement- polymer bitumen injection, a series of proprietary thin asphalt surface treatment, and just a stone mastic asphalt (SMA).

2.3 Factors considered in the design of the airport movement areas

In the design of this type of airport communications must consider many elements that influence the selection of the type of road and the track.

Due to technical factors we can include:

- the required operational performance of the road,
- climatic conditions at the construction site,
- engineering-geological conditions in the subsoil,
- characteristics of road building materials.

Between technical and organizational factors are advised:

- technological possibilities of building an organization that is a supplier of construction works,
- the possibilities of the considered road construction materials,
- requirements for technology services.

The socio-economic factors include:

- protection of the environment,
- use of local materials and waste,
- energy consumption of sourcing and execution of construction works,
- investment and production costs and total cost of construction, operation, maintenance and rehabilitation of the road.

2.4 Principles optimize the construction of the airport road in terms of soil mechanics

The basic element of the overall design optimization of airport road in which we choose such a track road, which is critical to the whole society most, optimization design of the road in terms of mechanics. This optimization refers mainly to carrier layers. The thickness and quality of the coatings of the road depends mainly on the size of the congestion on the desired operating characteristics of the road. Containing optimize the construction of the road in terms of airport drive design is the arrangement of the carrier layers, which should approximately equal the operating performance consistent with the desired number of repeated loads.

2.5 The impact of weather conditions on the asphalt airport movement area.

Climatic conditions, which vary from global warming affect all areas of life.

Before this phenomenon is not possible to turn a blind eye, even if the design of new structures airfields, especially in the planning and maintenance of the existing network, because the stress due to temperature is crucial for the functional capability of airport asphalt roads.

In evaluating the potential risks and vulnerabilities airfields be followed systematically. The first step is to determine the potential impacts of climate change. In the area of Central Europe, which belongs to the temperate regions can be observed:

1. an increase in the average air temperature,
2. Increase the maximum (extreme) temperatures,
3. an increase in rainfall, more extreme precipitation,
4. an increase in wind speed.

This leads to changes in the level of ground water, floods, reduced frost days during the winter, but compared to the increase in freezing cycles (freeze / thaw).

2.6 Congestion airport movement areas

Rated load capacity is made on the basis of evidence from experimental measurements or by theoretical calculations. Carrying capacity runway, taxiways and aprons must comply with the maximum load caused the aircraft, the operation of which is expected to be at the airport (so-called critical plane).

Load roads on airport movement areas ie the takeoff and runways, taxiways, parking areas and handling is defined different types of aircraft and annual throughput of these aircraft. Load of aircraft is characterized by:

- total weight of the aircraft,

- arrangement (chassis design)
- tire inflation.

Weight aircraft on airfields transmits chassis. Wheels aircraft operating on the surface area of the vertical pressure and horizontal forces. Vertical pressure draws static load aircraft standing on the ramp or in the parking lot. size pressure corresponds to the wheel load. When the vehicle is vertical load acting on the apron changes due to surface roughness.

3 CONCLUSION

The goal was to specify and describe the factors that affect the planning and design of airport movement areas. In the introduction of the work I tried to simply describe the current use of the asphalt roads at the airport movement areas.

In the second part I referred to the determinants and factors of design and material features, which are critical during the design, dimensioning and constructions of airport movements area.

In the work I tried to capture the essence of the problem, i.e. area of the traffic congestion and features of used materials, the impact of climate conditions such as rainfall and temperature effects on the design and the entire carrying capacity of airport asphalt pavement.

Since each airfield must bear certain voltage, there must also evaluated the carrying capacity of its subsoil. I used the CBR method which is the most common. In the last chapter I focused on the actual loading on the airport movement area.

I focused on the loading induced by the chassis leg of the aircraft, on its effects and on the design of the proper thickness of the Airport movements areas.

The ideally designed roadway naturally includes a large amount of calculations according to different methods. For the calculations was decisive the type of the aircraft design, helpful in reaching the values which determines further progress.

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