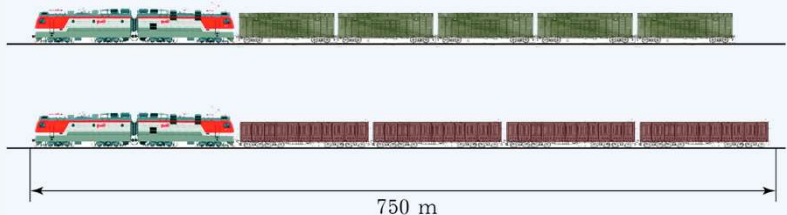


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Increase in number of axes of cars allows to increase by 20 – 40% running loading in the train



The axial load of 23 t, length of the train is 750 m:
Eight-wheel cars: 4600 t
Eight-axle cars: 6440 t

3

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Improvement of a design of cars

Use of light alloys in a design of cars

Application of polymeric composites in a design of cars

- **Decrease in mass of a tare**
- **Increase in resistance to corrosion**
- **Rational design of knots**
- **Increase in service life**

4

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Use of light alloys in a design of cars



The tank car for transportation of nitric acid of model 19-6901

Tikhvin plant of transport mechanical engineering

The car – a hopper for transportation of mineral fertilizers of model 19-1244

Ruzaevka plant of chemical mechanical engineering



The reached effect, in comparison with analogs :

- **decrease in mass of a tare by 2 - 4.5 t;**
- **increase in the appointed service life from 26 to 32 years**

5

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Use of composite materials



The car – a model hopper 19-5167

JSC «Uralvagonzavod»

Technical characteristics

Loading capacity, t	74
Tare mass, t	25,5±0,5
Body volume, m ³	125
Bogie model	18-194-1
Automatic coupling type	Ca-3
Mileage (up to the 1st depot repair) thousand. km/year	500/4
Car service life (bogies life)	32 ⁶

6

Use of composite materials

Container tank KCH/PKM (КЦХ-ПКМ) 25/0,4
JSC «Uralvagonzavod»

Technical characteristics



Maximum weight gross, kg	36 000
Tare mass, t	4 350
Container value, l	24 000
Working pressure, MPa	0,4
Length, mm	6 058
Height, mm	2 591
Width, mm	2438
Temperature range operation	from – 50 to + 50

Use of composite materials

The designed covered car and its comparison with analogs


	Designed car	Products analogs (model)				
		11-9923	11-1807-01	11-7094	11-2135-01	11-9962
Loading capacity, t	69	65	66,7	68,0	67	67,2
Tare mass, t	24,5	27,7	27	26,0	28,5	26,5
Body volume, m3	155	158	158	161	161	157,5
Car dimension	1-BM	1-BM	1-BM	1-T	1-T	1-BM
Design static axial load from wheel couple on a rail, t	23,5					
Car length on coupling axes, mm	17160	18900	н.д.	18720	18860	18325

8

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Increase in service life, reducing costs for service and repair

Bogie model 18-9855

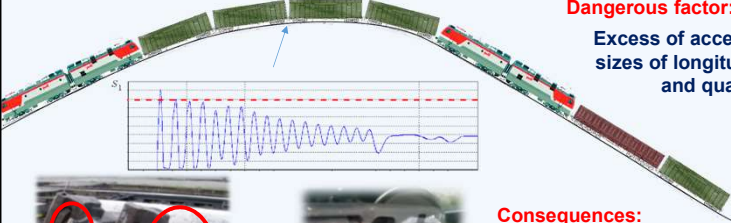


- Hi-tech production of the bearing structural elements of cars.
- Wearproof polymers in elements of boxen knots and the brake system.
- Systems of threadless connection of pipelines.
- Composite polymeric materials and high-strength wearproof cast iron in designs of bodies, bogies and also in boxen knots.
- Hi-tech elements in spring suspension of cars


9

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Increase in length and mass of the train



Dangerous factor:
Excess of acceptable level by sizes of longitudinal dynamic and quasistatic forces



Consequences:

- Damages of coupling devices, cars and the transported freights.
- Loss of stability of cars with the subsequent derailment

Decision:

- Scientific and engineering study of questions of formation and driving of long and heavy freight trains

10

Thank you for attention!

Contact us:

tu@miit.ru

olegep@mail.ru