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The development of new-generation trucks is highly topical for Ukrainian freight car fleet renewal. Important criteria for the assessment of existing or new truck designs are car ride quality and car component interaction improvement, wheel and rail wear reduction, and operational safety enhancement. The geometrical and elastic characteristics of new components must reduce truck resistance to curving and increase car stability both in tangents and in curves.

The aim of this work was to develop recommendations on the choice of elastic parameters for additional links in trucks of prospective freight cars. Use was made of methods of mathematical simulation, numerical integration, oscillation theory, and statistical dynamics.

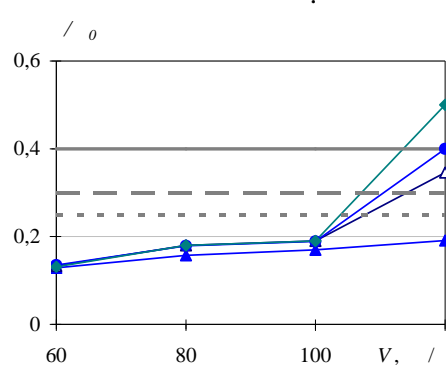
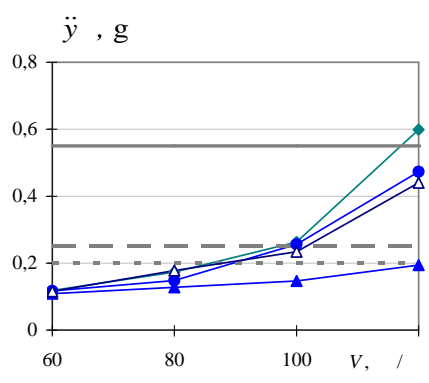
This paper presents the results of investigations into the choice of parameters for new components to be used in 18-7020 trucks: diagonal cross-braces between the side frames and an elastic adapter in the axlebox assembly. Emphasis is on the study of the wheel climb stability margin at different speeds in tangents and in curves. Advisable elastic parameters of additional links between truck components are determined.

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500  
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 -73-02  
 18-7020

$\ddot{y}$   
 $g$   $H_P$   $P_o$   
 18-7020,  
 ( 32 ) -73 -73-02,  
 ) 27 ( ), V 29 (



▲ -73  
 △ -73-02  
 ● -73-02  
 ◆ -73-02  
 - - -  
 - - -  
 - - -

-73,  
 ( (80 - 100) / ).

, , -  
 , [2, 5].  
 - ,  
 , " - " [6].  
 [4] [7, 8].  
 18-7020,  
 -73-02.  
 18-100 [9]: - 20 / ,  
 - 2,5 / ,  
 5 / . (10 / )  
 25 [10].  
 18-7020 [4],  
 ,  $\dot{y}_П, H_P$   
 " " -73 ,  
 3,5 .  
 ,  
 18-7020.

$F_y$                        $F_z$

[11]:

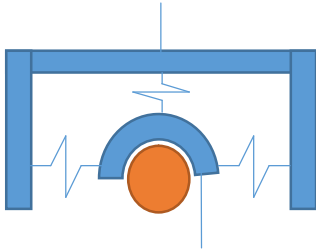
$$K_N = \frac{F_y}{F_z} \leq \frac{\operatorname{tg} \alpha - \mu}{1 + \mu \cdot \operatorname{tg} \alpha}, \quad (1)$$

$\alpha$  - ;  $\mu$  -

$$K_0 = \frac{\operatorname{tg} \alpha - \mu}{1 + \mu \cdot \operatorname{tg} \alpha} \quad (2)$$

0,23.

$\alpha = 68,5^\circ$ ,  $\mu = 0,23$ ,  
 $K_0 = 1,46$ .



.2

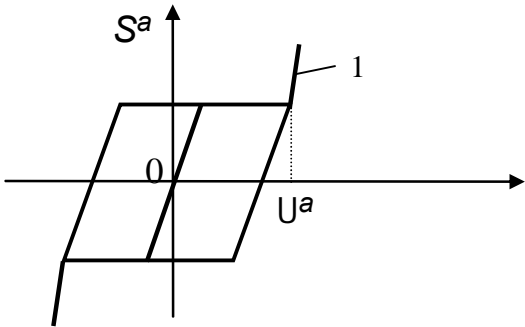
$K_N$   
18-7020

[9]

(  
);  
(  
);  
(  
).

.2.

$U^{ab} = 2$ ,



.3

(.3). 1 .3  
 $U^{ab}$ .

$K_N$

"

[9],

$K_x$

(5000 – 25000) / ,

$K_y = (1000 – 3000) /$

.4

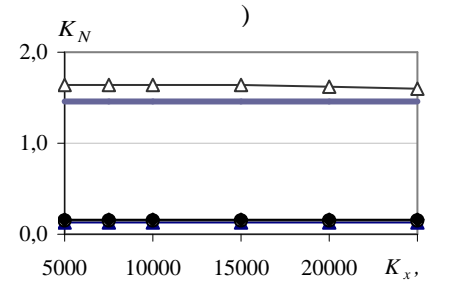
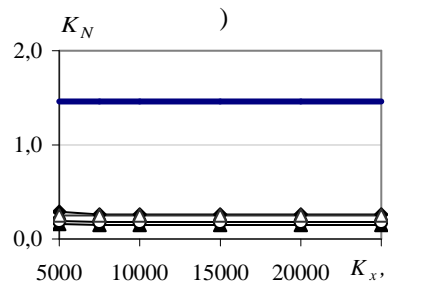
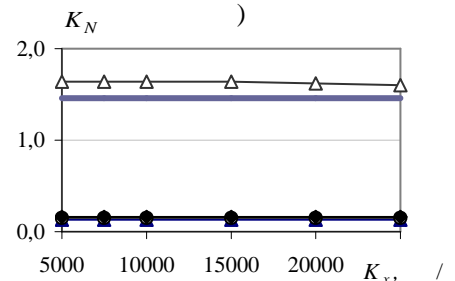
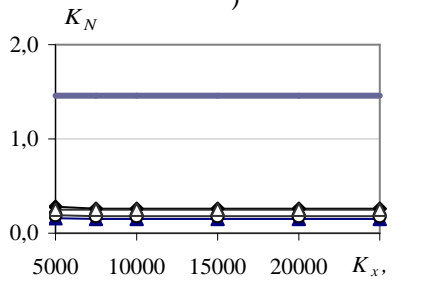
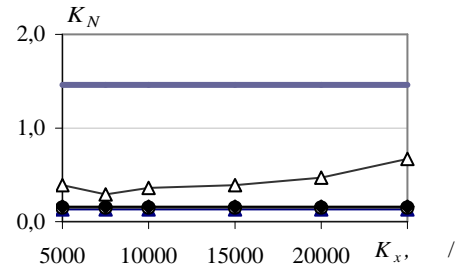
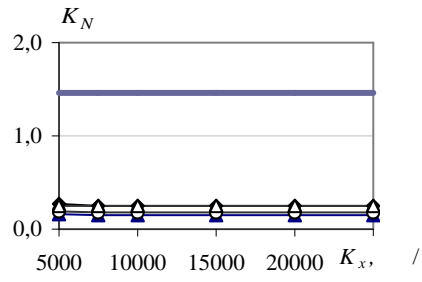
$K_N$

$K_x$   
(, ); 3000 / – ), )

$K_y$  (1000 / – ), ); 2000 / –

(, ), ) (, ), )

(60 – 100) /  $K_N$



- ▲ 60 /
- 80 /
- ◆ 100 /
- △ 120 /
- (thick blue line)

.4

$K_x, K_y$ .  
 $K_N$   
 $K_0$   $K_y = 2000$  /  $K_y = 3000$  /  $K_x$ .

.5

300 (

(40 - 80) / .4).

$K_N$  ( .5, ), ), ))

$K_x, K_y$ ,

( .5, ),

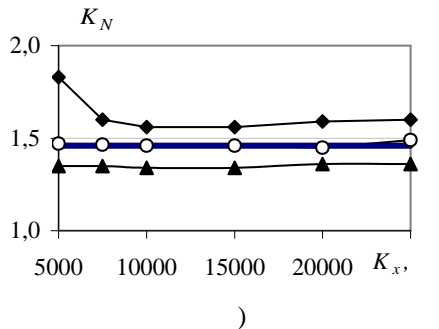
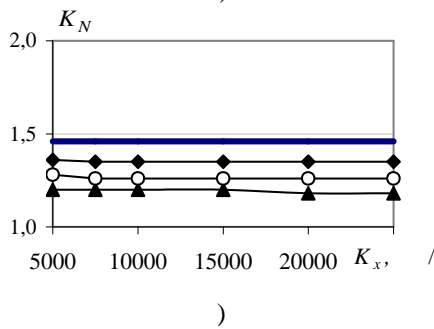
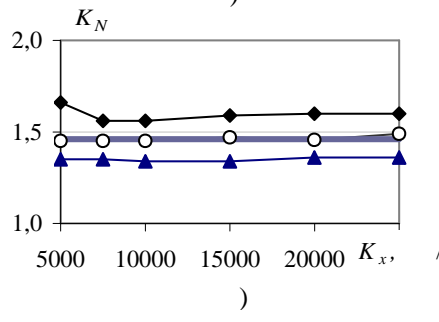
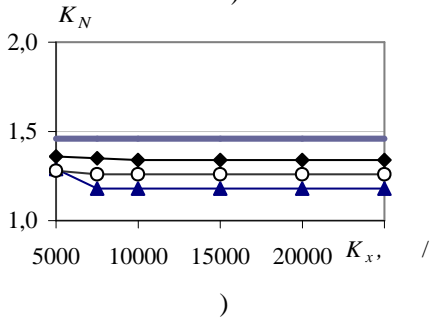
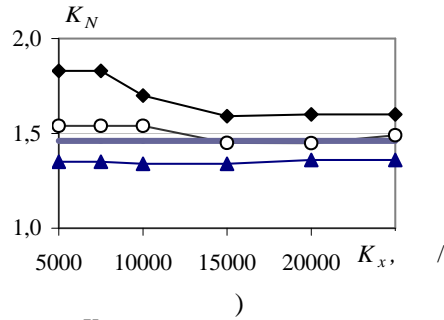
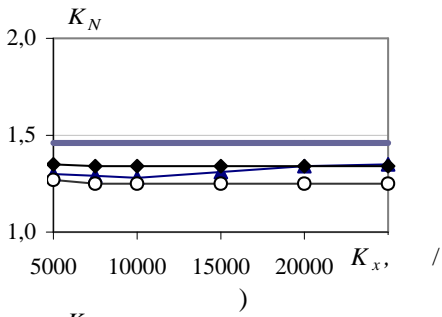
), ))

$K_y$  1000 /  $K_x < 15000$  / ,

60 / ,  
80 /

$K_x, K_y$ .

18-7020



- ▲ 40 /
- 60 /
- ◆ 80 /
- (blue line)

$K_x$  (15000 – 20000) / ,  $K_y$  – (1000 – 1500) / .

), 120 / ( 300 – 80 / 60 / .

[10].

18-7020

$K_N$

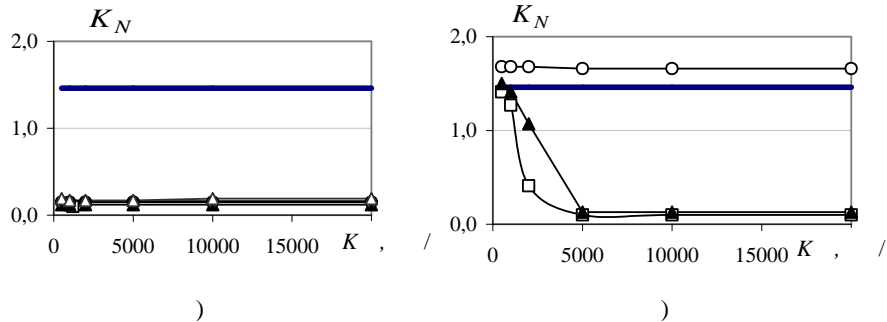
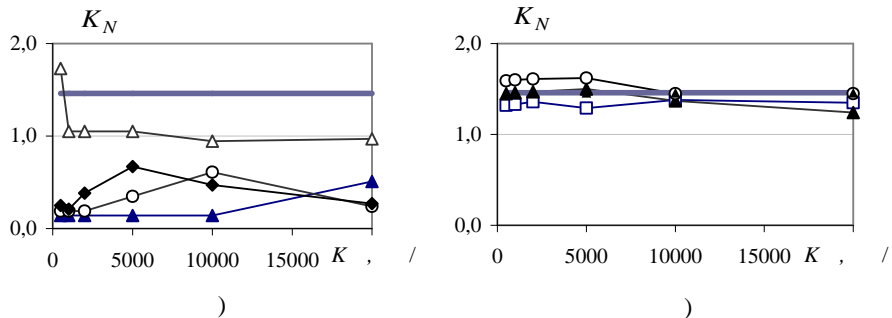
( . 6, ), )

300

( . 6, ), ).

$K$

(500 - 25000) / .



- 40 /
- ▲ 60 /
- 80 /
- ◆ 100 /
- △ 120 /

. 6

$K_N$  , -

120 /  $K$  1000

/ .

$K_0$   $K$  10000 / .

$K_N$  , -

$K_0$  40 / 60 / ,

80 / .

. 7

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$K_x = 15000$  / ,  $K_y = 1500$  /

$K = 15000$  / .

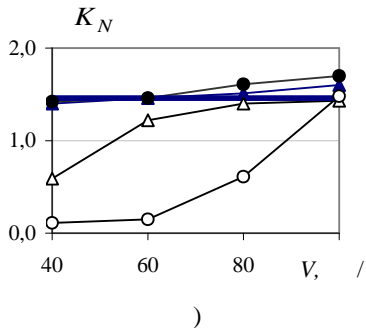
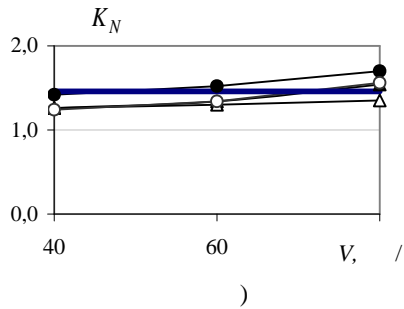
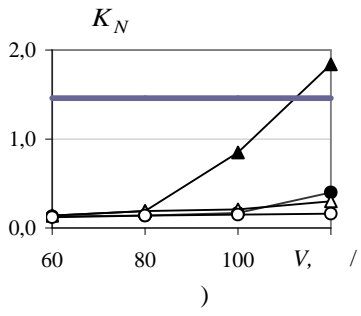
$K_N$

( . . 7, )

( . . 7, ).

600 ( . . 7, ) 300





.7

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$\ddot{y}$ ,  $H_p$  -

120 / -

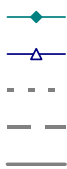
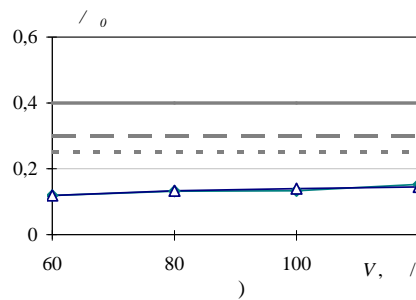
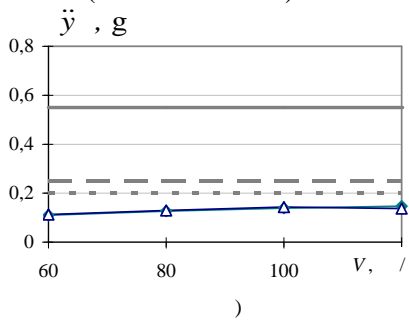
.8

$\ddot{y}$  ( .8, )  $H_p$  ( .8, )

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27 ( . .1).



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" "

" "

" "

.8

18-7020,

(15000 – 20000) / ,  
(1000 – 1500) / ;  
(10000 – 20000) / .

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( 6541230).

1. 18-7020 2. URL: <http://test.kvsz.com/index.php/ru/produktsiya/gruzovoe-vagonostroenie/khodovye-chasti/tezhki/item/833-dvukhosnaya-telezhka-model-18-7020>
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