CHOOSING OF SUSPENSION GEAR PARAMETERS OF COACHE MODEL 61-779

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EXTENDED ABSTRACT

1. INTRODUCTION

Researches that focused on choosing of running gear's parameters and especially on spring suspension parameters are very important during creation of new passenger rolling stock.

In the research calculations that determine strength characteristics of springs of central and axle-box suspension gear of bogies during its (bogies) using under coaches' (passenger cars) model 61-779 of JSC "Kryukov car-building company" are done and relevant dynamic parameters are determined. The simulation used a computer program «DYNRAIL», developed in Dnepropetrovsk National University of Railway Transport (DNURT). As a result of research parameters of spring suspension for designs of new passenger cars chosen.

2. MAIN PART

During choosing Technical Solutions for designs of new rolling stock researches that concern parameters of running gear and especially of spring suspension are very important. As in the context of providing of strength parameters, so with taking into account of car's dynamic load. Authors already made researches for long-wheelbase coaches (passenger cars) [1-4], but for different types of bogies.

In the research, calculations that determines strength characteristics of springs of central and axle-box suspension gear of bogies during using its (bogies) under coaches' model 61-779 are done and relevant dynamic parameters are determined.

Dynamic performance evaluation done by modelling the motion of the head and intermediate cars along the straight section of way, as well as on of the medium-range and short-range curve. The simulation uses a computer program «DYNRAIL» [5,6], developed in Dnepropetrovsk National University of Railway Transport (DNURT).

General view of bogie model 68-7041 with pneumatic spring in central suspension gear shown on Fig. 1.

Comparative calculations, with range of speeds till 250 km/h, for coach (passenger car) on bogies model KVZ-CNII, model 68-7007 with upgraded construction and model 68-7041 with pneumatic suspension gear done. Received results proved much better dynamical qualities and ware factors for cars on bogies models: 68-7007 and 68-7041.

Theoretical researches of coach (passenger car) dynamic load during its movement by straight track with speeds till 250 km/h, with aim of definition of car's dynamic parameters under difference bogies mass, are done. In case of minor modification of

pneumatic spring's stiffness, (484-567 kN/m vertical and 201-235 kN/m - lateral) dynamic parameters of core stage and smoothness of movement are almost the same.
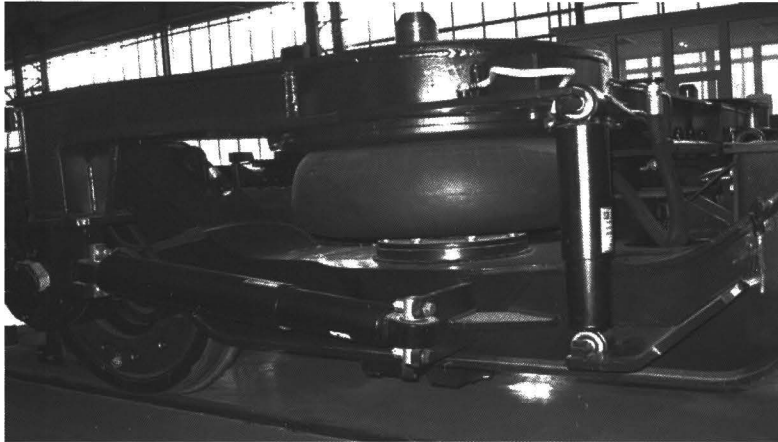

Fig. 1.General view of bogie model 68-7041 with pneumatic spring
in central suspension gear

Discovered that using of pneumatic springs leads to significant improvement of dynamic parameters in suspension core stage of coach. As a result of completed theoretical researches of dynamic loads of coach (passenger cars) were estimated optimal parameters of suspension gear for reaching movement speed till 200 km/h and till 300 km/h.

Following dynamic parameters were determined: the coefficient of vertical dynamics of the first stage of 1 degree Cdvb, the coefficient of horizontal dynamics of 1 degree Cdgb, the coefficient of vertical dynamics of 2 degree Cdvc, the stability coefficient Cs, the smoothness of movement in vertical and horizontal directions Wv and Wg. In addition to the main dynamic indicators there are additional ones: an indicator of wheel wear on driving surface (Is) and a wear indicator on wheel flange (If).

For searching of optimal parameters of central suspension gear of bogie 68-7007 was used method of Nelder-Mid, because it allows to find local minimum of objective function in the region of fixed point. As a result of calculations received optimal parameters of central and axle-box suspension`s stage all of them presents best results in comparison with usual bogies 68-7007. Same calculations done for coaches (passenger cars) on bogies 68-7041, for which optimal parameters of suspension gear are determined too and used in real constructions. Completed experimental researches completely proved correctness of chosen parameters of suspension gear for improvement dynamical qualities of coaches (passenger cars).

3. CONCLUSION

In summary, because of estimation of suspension gear strength parameters and estimation of coach (passenger car) dynamic parameters on the base of different bogies received conclusion about full correspondence of accepted technical solutions for running gear to requirements of normative documents.

4. REFERENCES

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