Automation of assignment of rational thin-walled parts turning mode

© P.A. Eremeykin[1], A.D. Zhargalova[2],

[1]Mechanical Engineering Research Institute of the Russian Academy of Sciences, 101990 Moscow, Russia
[2]Bauman Moscow State Technical University, 105005 Moscow, Russia

This article deals with the problem of rational turning mode assignment for thin-walled workpieces. In this instance, the deformations of the workpiece, caused by cutting and clamping forces, strongly affect the accuracy of the result. Deformed workpiece processing leads to significant deviations from a predetermined size. Traditional thin-walled parts processing methods (using machining attachments) are inappropriate in some cases. For example, it is not profitable to use special machining attachments for small batch processing. So, the method of rational turning mode assignment is proposed as an alternative. One can assign the rational turning mode based on accounting rigidity of workpiece. This "soft" mode is required to provide small processing deformations. CAE modeling method is appropriate to resolve the parameters of rational mode. Depending on modeling results, one can choose apply either traditional method or process the workpiece with standard machining attachments (e.g. three-jaw chuck). To use the method on practice, it is required to reduce its applicability. To this end the software system was developed. This paper considers technical aspects of implementing the system and related problems resolution.

Keywords: *turning, deformation, thin-walled part, modelling, software development*

REFERENCES

[1] Campbell F.C. *Manufacturing Technology for Aerospace Structural Materials.* Elsevier Ltd, 2006, 603 p.
[2] Gavryushin S.S., Zhargalova A.D., Lazarenko G.P., Semisalov V.I. Metod opredeleniya usloviy mekhanicheskoy obrabotki tonkostennyh detaley. *Izvestiya vysshih uchebnyh zavedeniy. Mashinostroenie,* 2015 № 11, pp. 53-60
[3] Böck H. *The Define Guide to NetBeans Platform 7.* Apress, 2012, 558 p.
[4] Eremeykin P.A. Sistema analiza deformaciy tonkostennyh detaley pri tokarnoy obrabotke [Electronic resource]. *Molodezhnyy nauchno-tekhnicheskiy vestnik,* 2016, № 5 URL: http://sntbul.bmstu.ru/doc/840485.html (accessed 02 November 2016)
[5] Eremeykin P.A. Razrabotka programmnogo instrumenta dlya rascheta rezhimov rezaniya tokarnoy obrabotki kalkulyator [Electronic resource]. *Molodezhnyy nauchno-tekhnicheskiy vestnik*, 2015, № 7.
URL: http://sntbul.bmstu.ru/doc/791980.html (accessed 02 November 2016)
[6] Kosilova A.G., Meshcheryakov R.K. *Spravochnik tekhnologa mashinostroitelya. Vol. 2.* Moscow, Mashinostroenie, 1986, 418 p.
[7] Drools Documentation. *JBossDeveloper*, 2016. URL: http://docs.jboss.org/drools/release/6.4.0.Final/drools-docs/html/
[8] Evgenev G.B., Gavryushin S.S., Groshev A.V., Ovsyannikov M.V., Shilnikov P.S. Osnovy avtomatizacii tekhnologicheskih processov i proizvodstv. Moscow, BMSTU, 2015, 441 p.
[9] Gavryushin S.S., Baryshnikova O.O., Boriskin O.F. Chislenniy analiz elementov konstrukciy mashin i priborov. Moscow, BMSTU, 2014, 480 p.

[10] Boudreau T., Tulach J., Wielenga G. *Rich Client Programming: Plugging into the NetBeans Platform* Prentice Hall, 2007, 640 p.

Eremeykin P.A. — graduate student, Mechanical Engineering Research Institute of the Russian Academy of Sciences. e-mail: eremeykin@gmail.com

Zhargalova A.D. — senior lecturer, «Computer Systems of Manufacture Automation» Bauman Moscow State Technical University. e-mail: azhargalova@bmstu.ru