How to Improve the Safety of High-Speed Cutters- to reduce the weight of cutters

reduce the number of tool components, simplifying the structure of tools, it is concluded that by comparison, the lighter tool is, the less number of components and less component contact surface, the higher maximum turning speed of the tool . The study found a cutter with titanium material can reduce the weight of components and then improve tool break limit and maximum turning speed. However, due to the sensitivity of titanium to the cutting edge, it is not suitable for making a cutter body, so some high-speed cutter is made of high-strength aluminum alloy as its tool body.

Considering from the cutter structure, it should be considered to avoid and reduce stress concentration, flutes on cutter body (including the holder flute,chip flute, key slot) will cause stress concentration and then the strength of cutter body is reduced, therefore the sharp corners should be avoided through the flute and at the bottom of flute. At the same time, the structure of the cutter body should be symmetrical to the rotary axis,so that the gravity can go through the axis. The clamping way of cutter and holder and structural adjustment should eliminate clearance and require excellent repeated positioning. Currently, high-speed cutter has been widely connected by HSK shank to the main axis of lathe, which, at a large extent, improves the rigidity and repeat positioning accuracy of tool system, and help improve the maximum speed at break limit. In addition, clamped high-speed milling cutters tend to be smaller in diameter, less teeth, it is also conducive to the improvement of the tool strength and rigidity.