

Vibration Data Base (v BASE) Committee, The Japan Society of Mechanical Engineers



## Table 1 Testing conditions

| Tool                               | φ3 ball end mill |
|------------------------------------|------------------|
| Number of flutes                   | 2                |
| Tool projection length [mm]        | 60               |
| Spindle speed [min <sup>-1</sup> ] | 21221            |
| Feed rate [mm/tooth]               | 0.15             |
| Axial depth of cut [mm]            | 0.02             |
| Workpiece material                 | Ti-6Al-4V        |
| Cutting fluid                      | Soluble          |



 $1/g_m$  is reciprocal number of the gain margin in the analysis, result indicates that the larger this value, the more liable for chattering vibration to occur (to become larger). On the other hand, amplitudes as a result of experiment represent the variations of cutting force due to vibrations, and the larger this value, the more violent chattering vibrations occur.

Due to impacts of phenomena that are not considered in the analysis model,  $1/g_m$  as a result of analysis goes far beyond the stability limit  $(1/g_m >> 1)$ , so that only a qualitative comparison is made as to the results of analysis and experiment.

## Fig.4 Results of analysis and experiment