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Reliability prediction of Centerless grinding machine

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Key Words: Reliability(), Prediction(), Centerless grinding()

Abstract

As recently optical communication industry is developed, request of optical communication part is increased. Ferrule is very important part which determines transmission efficiency and quality of information in the optical communication part. Most of ferrule processes are grinding which request high processing precision. The ultra precision centerless grinding machine for ferrule grinding was designed. The centerless grinding machine is composed of the high damping bed, grinding wheel spindle unit, regulating wheel spindle unit, feeding table and dressing unit. Reliability prediction was very important for the high quality design. In this study, centerless grinding machine was predicted reliability.

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(ZrO₂)
1μm
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50nm
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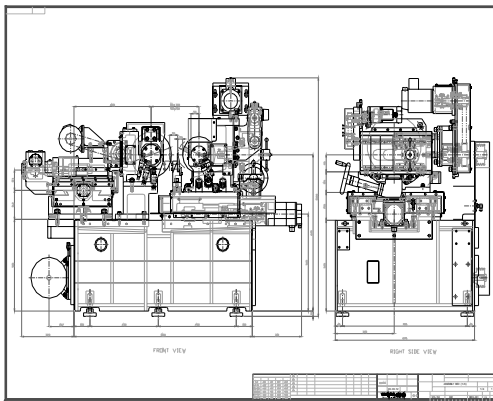


Fig. 1 Design of centerless grinding

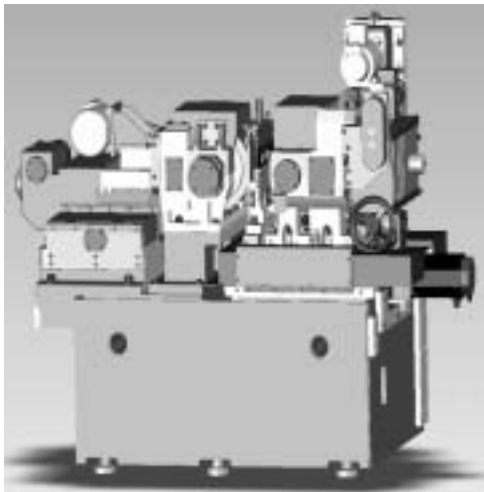


Fig. 2 3D Modeling data of centerless grinding

Regulating wheel
가
3D
Modeling Fig. 1,2
Fig. 1,2
Table 1

Table 1 Specification of grinding machine

Unit	Specification
Grinding wheel diameter	250mm
Grinding drive motor	3.7kW/AC
Regulating wheel diameter	250mm
Regulating rpm	10-300
Regulating tilting angle	+5° - -1°

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3.1
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NSWC (Naval surface warfare center)

NPRD (Nonelectronic part reliability data), EPRD (Electronic parts reliability data)

(4)

NSWC,
NPRD, EPRD data

3.2 Grinding Grinding
 wheel head Grinding wheel spindle mount
 , Regulating wheel head
 Regulating wheel spindle mount ,
 regulating wheel table
 가 가
 Bed

Fig. 3

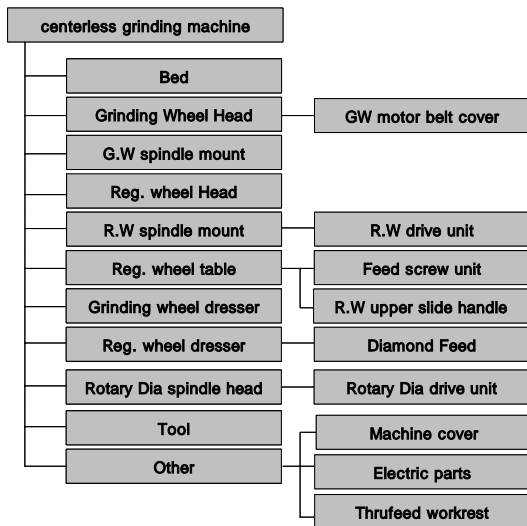


Fig. 3 Assemble formation of Centerless grinding for reliability prediction

3.3 Failure rate 165.98 , MTBF 6024

Failure rate MTBF
 Fig. 4,5 Grinding wheel head
 Failure rate가 가 38.48 ,
 MTBF 25982 1 24
 2.9

Fig. 6

Grinding wheel head가 가

Regulating wheel table Failure rate가 31.88 ,
 MTBF가 31363

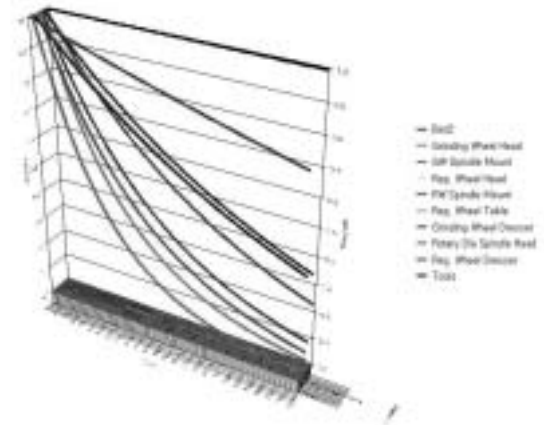


Fig. 4 Failure rate according to the time

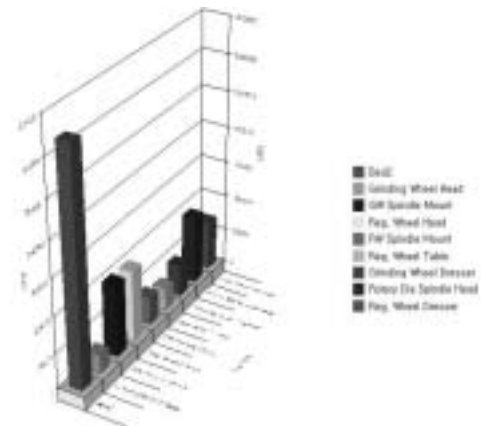


Fig. 5 MTBF of part assemble

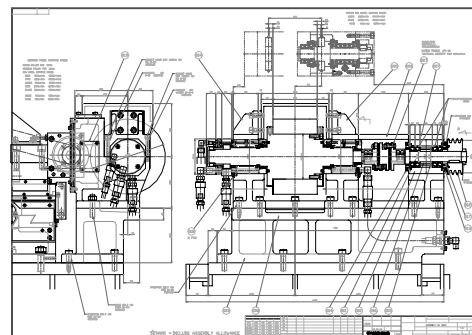


Fig. 6 Design of Grinding wheel head

Grinding wheel head ,
 . NSWC, NPRD data

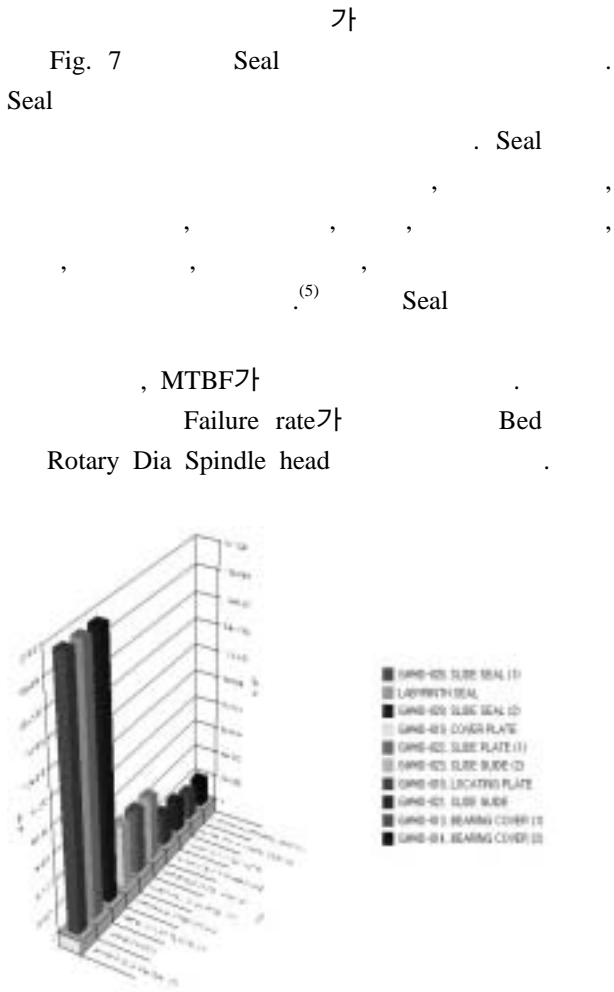


Fig. 7 MTBF of part for grinding wheel head

Seal
 가
 grinding wheel head, Regulating
 wheel table, RW Spindle mount
 가
 grinding wheel head 가
 가
 4.

1. Failure rate
 165.98, MTBF 6024

2. grinding wheel head 가 가

3. 가 가 Seal

4. 가 가

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