



The 4th Joint
MMM-Intermag
Conference

Vancouver, British Columbia, Canada
July 12-15, 1988

EE-02

2:30

REPRODUCING EFFICIENCY OF PERPENDICULAR HEAD

Setsuo Yamamoto, Yoshihisa Nakamura and Shun-ichi Iwasaki
Res. Inst. of Elec. Commun., Tohoku Univ.
1-1, Katahira 2-chome, Sendai, 980 JAPAN

Recording and reproducing at densities over 500kFRPI is possible with a single-pole perpendicular head and a Co-Cr/Ni-Fe medium¹. To obtain a sufficient signal-to-noise ratio at such high densities, the reproducing efficiency of the head has to be improved: this paper describes guidelines for this.

The reproducing efficiency of three types of head was analyzed by the two-dimensional finite element method. The head types were (a) an auxiliary-pole driven type head², (b) a main-pole driven type head, which we presently use¹, and (c) a thin film head, which was designed by miniaturizing head (b) with a reduction scale of one-fifth in the main pole length.

The reproducing efficiency was defined as the ratio of the magnetic flux linking the coil to the total flux which emerged from the Co-Cr layer. We found that the reproducing efficiency for head (b) is more than the double of that for head (a). We also confirmed this improvement experimentally, and found that the reproduced voltage for an actual main-pole driven type head is $50nV_{o-p}/[\text{turn} \cdot (\text{m/s}) \cdot \mu\text{m}]$. However, even for head (b), 85% of the magnetic flux from the medium is lost, because the magnetic resistance of the main pole is large. Thus, to achieve a high reproducing efficiency, shortening the length of the main pole and locating the coil close to the main pole film are very effective. For head (c), these requirements are satisfied, and a reproducing efficiency of over 80% is obtained.

In conclusion, we believe reproducing efficiencies increased by more than fivefold, compared to the head we presently use, are possible when the thin film head proposed here is made.

- [1] S.Yamamoto, Y.Nakamura and S.Iwasaki: IEEE Trans. on Magn., MAG-23, 5, (1987).
- [2] S.Iwasaki and Y.Nakamura: IEEE Trans. on Magn., MAG-14, 5, (1978).