The capillary interface under lubrication conditions

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The bearing technology of choice in the entire range of hard disk drive (HDD) products, from micro-drives to high speed server drives, is the fluid dynamic bearing (FDB). Such bearings offer quiet operation and shock resistance and are replacing ball bearings in HDDs. In the fluid dynamic spindles of hard disk drives FDB's operate without maintenance over many years while providing extremely precise support for the rotating disk pack. The capillary interface in FDB's shows some similarity with Hele-Shaw flows. The conditions that set FDB's apart are their relatively large capillary number (shear force / capillary force > 1) suggesting that fluid shear stresses exert a strong influence on the shape of the interface.

We wish to construct effective mathematical models and their solutions for the behavior of capillary interfaces in FDBs.