

## RESEARCH ON NON-EQUIDISTANT THRUST SYSTEM OF SHIELD MACHINES UNDER COMPOSITE GROUND

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Among the three principal subsystems in shield machine – cutting system, thrust system, and lining system – the thrust system plays the most important role in the shield machine. In the anisotropy of excavation interface rocks, however, the inconsistencies of resistance surrounding the machine and its own weight create a complicated working situation where the offset load on segments would be easily generated. Many tunneling projects constructed by mixed shield machine in China have shown that over load on segments has caused the cracked segments accounting for 90% of all cracked segments, especially in Guangzhou City.

What on earth caused it? It is exactly that there are more load, while there are less jacks for bearing that (Fig. 1). For the development of new system with adaptability to inhomogeneous ground, the non-equidistant thrust system has been proposed (Fig. 2). Firstly, the force transmission characteristics have been studied on ground of mechanical model. Then, the spatial force ellipse has been discovered eccentricities for these ellipses can be used to measure the uniform degree of forces applied on lining segments. Several ways to evaluate force transmission performance have come forward. The results may provide a theoretical foundation and support for the design of an anti-unbalance load driving system.

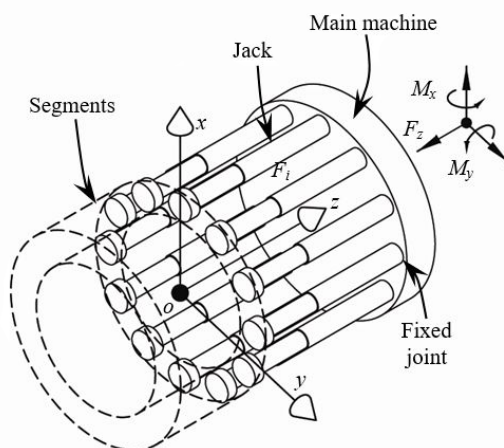


Fig. 1: Traditional even -spacing thrust system

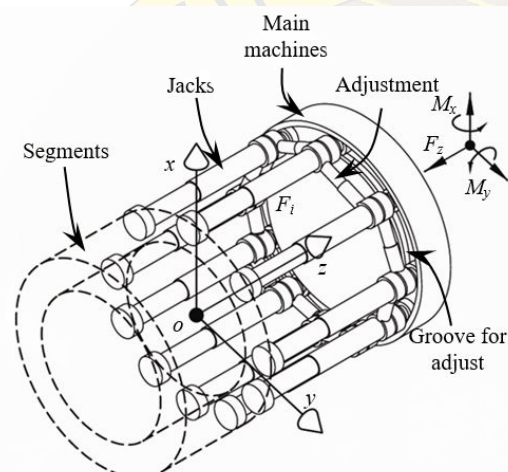


Fig. 2: Non-equidistant thrust system with adaptability to ground