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Barreling ahead in the global tunneling market:

Korea develops the world's first software for automating cutter head design.

The Ministry of Land, Infrastructure and Transport of Korea(MOLIT) announced on July 16 that Korea developed the world's first software that automates designing of the cutter head used in the Tunnel Boring Machine(TBM) and Korea's own TBM control system.

TBM is a machine that excavates a tunnel with a rotating cutter head installed in front of the machine. Before the TBM, construction companies relied on explosives to blast off a surface area, causing noise and tremors in the process. The cutter head design software was developed by the Korea Institute of Civil Engineering and Construction Technology(KICT) and EMK Co., a Korean energy and machinery company, in a 9.4billion won research and development project funded by MOLIT.

The conventional way of designing a cutter head so far was to do it manually in reflection of the conditions of a surface area where tunneling is planned. Such customization raises the costs of a cutter head. In addition, the exclusivity of the TBM technology- only six countries (Germany, America, Japan, China, Australia and Canada) are known to have the capacity to design and manufacture the TBM - makes the machine more expensive.

The TBM cutter head design software will use a 3D modeling to produce an ideal cutter design based on the ground data fed by an engineer. With the automation enabled by the software, the time for designing a cutter head will be reduced from an average of a month now to less than three days.

As for the TBM control system, it supervises and controls machine operation including the boring speed and direction. Like the cutter head design, only a few advanced countries provide the equipment and the software that controls the system. The new control system, which was developed with Korea's own technologies, will bring Korea one step closer to the fully localized production of the TBM.

Use of the TBMs in tunnel construction is rising fast due to its obvious benefits compared to the traditional method of drilling and blasting like less noise and tremors from construction sites. Given the rising demand for underground tunneling in cities and at sea, the machine will become a choice of tool for many construction projects. According to the Research and Markets 2020, the global TBM market is forecast to grow to 8.4 trillion won by 2027.

Lee Sang-joo, Director General for Construction Technology Policy of MOLIT says, "The TBM cutter head design software and the TBM control system are big technological achievements that will advance Korea's position in the global TBM market." "With further refinement for commercialization and sharing of the technologies with Korean SMEs, I believe Korea's share in the global TBM market will grow."