



Research Article

Investigation of friction characteristics of control cables

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ABSTRACT

This study aims to minimize the friction forces in order to obtain the best feel and minimum effort in the command and control cable part of the shift systems. For this purpose, lubricant, amount of lubricant and application method were investigated. Theoretical and experimental approaches are discussed by examining the studies on this subject. In the presented study, friction measurements were taken in the laboratory environment by applying different amounts of lubrication on the wire exposed to friction, and the amount of lubrication required for minimum effort was determined experimentally. It was observed that the friction force was decreased about 60% with oil running compared to dry running. Studies show that friction forces increase in excessive lubrication as well as in cases where there is no lubrication and little lubrication. The optimum amount of oil was obtained to be 0.1 g. It has developed guidelines for determining the friction factor for those who design shift cable and control cable used in different areas.

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INTRODUCTION

New research focuses on issues such as increasing vehicle driving comfort, improving NVH values, and improving user feel. When we consider the components, we use the most as a driver, one of the leading ones is undoubtedly the gear shift mechanism. System that provides gear change in vehicles; It consists of a mechanism called shifter that provides forward-backward and left-right movements under the gear lever and cables that transmit these movements to the transmission. The cables generally consist of the inner cable, the protective sheath defined as conduit, the fasteners connecting the transmission and the shifter and the grommet.

Control cable is a type of flexible cable used to transmit mechanical force or motion with an inner cable movement in association with a conduit. Figure 1 shows the schematic view of the inner cable and conduit pair. Generally, it consists of inner cable providing movement, teflon tube as sheath to reduce friction, protective sheath defined as conduit that protects these two from external impacts and corrosion, fasteners connecting the inner cable with the mechanism and grommets that enable positioning between the interior and exterior of the vehicle. It is generally used in bicycle, motorcycle and automobile brake and gear systems. Recently, researchers who are doing robotic research and designing medical devices have included motion cables in robot applications [1, 2].

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AUTHORSHIP CONTRIBUTIONS

Authors equally contributed to this work.

DATA AVAILABILITY STATEMENT

The published publication includes all graphics and data collected or developed during the study.

CONFLICT OF INTEREST

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

ETHICS

There are no ethical issues with the publication of this manuscript.

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