

Title	An expeperimental study in the properties of the curved detached shock
Sub Title	
Author	松井, 潔(Matsui, Kiyoshi)
Publisher	慶応義塾大学藤原記念工学部
Publication year	1964
Jtitle	Proceedings of the Fujihara Memorial Faculty of Engineering Keio University (慶応義塾大学藤原記念工学部研究報告). Vol.17, No.66 (1964.) ,p.54(10)- 54(10)
JaLC DOI	
Abstract	
Notes	Summaries of Doctor and Master Theses Master of Engineering, 1964 Mechanical Engineering
Genre	Departmental Bulletin Paper
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=KO50001004-00170066-0010

慶應義塾大学学術情報リポジトリ(KOARA)に掲載されているコンテンツの著作権は、それぞれの著作者、学会または出版社/発行者に帰属し、その権利は著作権法によって保護されています。引用にあたっては、著作権法を遵守してご利用ください。

The copyrights of content available on the KeiO Associated Repository of Academic resources (KOARA) belong to the respective authors, academic societies, or publishers/issuers, and these rights are protected by the Japanese Copyright Act. When quoting the content, please follow the Japanese copyright act.

An Experimental Study in the Properties of the Curved Detached Shock

Kiyoshi MATSUI*

At the tip of a wedge in a supersonic flow there attaches an oblique shock, when the free stream Mach number is sufficiently high for the wedge angle. However, in the case when the free stream Mach number is not so high for the wedge angle and the wedge angle is greater than the maximum turning angle of the oblique shock for the given free stream Mach number, we observe in practice a curved detached shock in front of the wedge.

With a curved detached shock, there is a segment of the shock for every solution of the oblique shock pertaining to the given Mach number, and the circumstances are complicated. Behind the curved detached shock the flow is in part supersonic and in part subsonic, so the curved detached shock is no more independent of the conditions in downstream, and its shape and location are influenced by those conditions. The mathematical analysis leads to great difficulties because of the radically different properties of the differential equations for the subsonic and supersonic flow.

This study investigates experimentally the aspects of the flow with the curved detached shock in front of two wedges and two flat plates, in order to study the properties of the curved detached shock. Namely, to study how the shape and the location of the curved detached shock are influenced by the conditions in downstream, and on the curved detached shock to what range the strong solution of the oblique shock presents itself is intended.

Wedges, whose total angle is 60° and 90° , and flat plates are used as models, the shock tube as an intermittent wind tunnel, a Mach Zehnder interferometer as the measurement instrument.

The study is made by changing the stagger of the two models and observing the flow aspects in each case.

As a result of the experiments, typical flow aspects of the flow with the curved detached shock in front of two wedges and two plates are observed and the following qualitative properties of the curved detached shock are made clear.

1. The location of the curved detached shock is largely influenced by the back pressure.
2. Only small part on the curved detached shock can have the strong solution of the oblique shock for the given Mach number of the free stream.

*松 井 潔