AEROSPACE INFORMATION REPORT

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# SKID CONTROL SYSTEM VIBRATION SURVEY

During 1957, an industry survey was conducted by the SAE A-5 Committee to determine realistic vibration requirements for skid control system specifications. A questionnaire was sent to sixteen airframe manufacturers, three Government agencies, and five skid control system manufacturers. This questionnaire asked for any information that might be available on the vibration characteristics that had been either experienced or calculated on an aircraft in the areas where skid control system components would normally be located, specifically at the axle and at the control box locations.

Replies were received from eleven airframe manufacturers, one Government agency, and two skid control manufacturers. Six of these replies stated that they had no information available. Eight airframe manufacturers reported either estimated or measured values as follows:

| Company Reporting | Axle Vibration | | Box Location Vibration | |
|---|---|---|---|---|
| | Meas. | Est. | Meas. | Est. |
| Boeing | | X | | X |
| Convair, S D | | | X | |
| Convair, F W | | X | X | |
| Fairchild | X | | | |
| Lockheed | X | | | |
| McDonnell | X | | | |
| North American | X | | | |
| Northrop | | X | X | |

The reported values are plotted on Figures 1 and 2 showing the comparison of these values with the AS 483B vibration requirements.

Study of the figures shows that vibration may occur at the control box location with values varying from .03 g to 10 g and from 5 cps to 1,000 cps. Axle vibration values vary from .3 g to 200 g and 5 cps to 1,000 cps.

At the A-5 meeting in October, 1957, the results of this survey were reviewed and it was agreed that skid control system specifications should contain minimum vibration requirements with the stipulation that, if more extreme conditions were anticipated in the aircraft, the higher values should be used in the qualification test. Since the values of the survey are so widely scattered, it would be difficult, if not impossible, to accurately represent more rigorous conditions to be followed in a general specification.

This information is presented merely to show the conditions that exist in some airplanes and it should be used cautiously in requiring higher vibration values for any qualification test. It should be kept in mind that these axle vibration conditions may be transients and only occur for extremely short periods of time during a landing.





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In 1964, a survey similar to that which was completed in 1957 was conducted to determine if there was later information that would affect skid control system requirements. Fourteen answers to the questionnaire were received. The results are as follows:

| Source | No. | Information |
|---|---|---|
| Airframe Manufacturers | 6 | See following paragraph |
| Military | 0 | |
| Airlines | 2 | No new information* |
| Wheel, Brake, and Skid Control Manufacturers | 6 | No new information |
| | 14 | |

Information from Airframe Manufacturers:

1 - Nothing new.

1 - Same as AS 483.

1 - Same as AS 483 but with noise requirement added.

3 - Similar to AS 483 but with higher amplitude at low frequency and lower amplitude at very high frequency.

This information is estimated and is included in each of these company's specifications for specific aircraft equipment. One of these airframe manufacturers gave measured values of axle vibration which are slightly higher than indicated in the 1957 survey.

This information has been added to Figures 1 and 2 as noted in the figure margins.

*One airline reported a severe vibration condition of the gear on one model airplane but the skid control wheel driven units did not appear to be adversely affected as compared to the same unit on other models.