MEMORANDUM For Procurement Officer.

Subject: Contract Nav-2049 — Scale equipment, 16-foot high-speed tunnel, Langley Field, Va.

Reference:  
(1) Toledo Scale Company letter dated January 10, 1944, NCH.bjs.  
(2) Letter to Toledo Scale Company, Dec. 21, SLE.mlh.  
(3) Specifications for Scale Equipment for 16-Foot Wind Tunnel, AAL, Number N-421, dated November 26, 1942.

1. Reference 2 listed minor changes in the scale specifications (reference 3) for the LMAL 16-foot high-speed wind tunnel. These changes consisted principally in the extension of the drag scale capacities from ±3500 pounds, as in reference 1, to ±5000 pounds. On the basis of the very satisfactory operation of the 8-foot high-speed tunnel drag scale system, it was also specified that high and low capacity drag scales should be provided, rather than a single drag scale of intermediate sensitivity. No change was made in the scale sensitivities required in the original specifications (reference 1).

2. In reference 1 the Toledo Scale Company states that the sensitivity as required in the original drag scale specification cannot be obtained and suggests that one-pound scale graduations rather than 0.1-pound graduations be employed. It is thus implied that the sensitivity required is too fine by a factor of ten over what can actually be obtained. In this connection it may be pointed out that the 8-foot high-speed tunnel sensitive drag scales have graduations of 0.050 pounds, and that the drag data obtained show that these fine graduations are justified. In order to obtain the same accuracy for our aerodynamic data at the 16-foot high-speed tunnel, 0.2-pound graduations must be used. This figure conforms to the requirement for the alternate single drag scale described in the original specifications (reference 3). Drag scales with graduations coarser
than 0.2 pounds would be inadequate for our use. With
the 1-pound graduations mentioned by Toledo in reference
1 we could not obtain significant drag data at speeds
below 200 miles per hour on many of the models we plan
to test.

3. As noted in paragraph 1 of reference 1 the
pre-load weight of 625 pounds at the sensitive drag
scale appears to be the factor limiting the accuracy of
this scale. This weight is necessary to counterbalance
the maximum negative drag load of 5000 pounds. The
limiting negative drag load required of the sensitive
drag scale, however, is only 400 pounds (references 2
and 3). For drag loads in the range from -400 to -5000
pounds the sensitive drag scale will not be used, and
the only necessity for the pre-load weight of 625 pounds
is to prevent an up-load being applied to the sensitive
drag scale. It is suggested that a pre-load weight of
50 pounds be used instead of 625 pounds. This weight
would balance the required drag load of -400 pounds and,
it is believed, would permit the attainment of the
accuracy required in our specifications. In order to
prevent an up-load from being applied to the sensitive
drag scale when -400 pounds drag is exceeded, it is
suggested that a device be incorporated in the scale to
lock it out after the -400-pound load has been exceeded
and to permit the high capacity drag scale to continue
to function normally to the limit of its capacity (-5000
pounds). Manual application of this locking device
will be acceptable.

4. In regard to the increases in size of the
levers, bellcranks, etc. mentioned in the third para-
graph of reference 1, we agree that such increases in
size will be necessary. Both the original specifications
(reference 3 section 42) and the specification of changes
(reference 2 section 38) anticipate and provide for such
alterations.

5. In regard to the question concerning the
indication of the scale dials on the control panel
(fourth paragraph of reference 1), it is desired that
these dials indicate the total load carried by each
scale, as stated in the original specifications.

6. It is requested that the contents of this
memorandum be transmitted to the Toledo Scale Company
with a request for comments on the method suggested in
paragraph 3 for obtaining the necessary sensitivity for
the low capacity drag scale.

7. In reference 1 so many exceptions are taken to the original specifications that it appears that the original specifications may have been modified by AAL. It is requested that we be notified of any such changes that may have been made. We would like to know what scale capacities, ranges, etc. are actually being supplied to AAL. It is also requested that we be informed of the results of the tests of the trial scale at AAL.

John V. Becker,
Aeronautical Engineer.

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