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THE UNIVERSITY OF MICHIGAN

COLLEGE OF ENGINEERING
DEPARTMENT OF NAVAL ARCHITECTURE AND MARINE ENGINEERING
SHIP HYDRODYNAMICS LABORATORY

Final Report

Resistance and Propulsion Test Results on a 1/4.5 Scale Model of the LVTPX12 Amphibian

J. L. MOSS
N. E. RABE
D. L. BENDER

Under contract with:

Chrysler Corporation
Defense Engineering
DEX-39079
Centerline, Michigan

Administered through:

April 1965

OFFICE OF RESEARCH ADMINISTRATION • ANN ARBOR

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INTRODUCTION

Under contract with Chrysler Corporation resistance and DHP tests were performed on a metal 1/4.5 scale model of the proposed LVT PX12 amphibious vehicle. Additional resistance tests were conducted on a wood 1/5 scale model. This model had been previously used for preliminary resistance and propulsion tests in 1963 and 1964. The basic 1/4.5 scale model was built of aluminum by Chrysler Corporation and several bow and stern alterations were built in the laboratory workshop. This model was equipped initially for track propulsion and later for twin screw propeller propulsion. All miscellaneous hardware was furnished by the sponsor. The 1/5 scale wood model was built in 1963 in the laboratory workshop. Schematic wood tracks are affixed to this model.

The primary purpose of this test program was to investigate the influence of various hull and propulsion alterations on the required horsepower with as a final object to achieve as great a speed as possible with track propulsion, for the available horsepower.

Several more general investigations were conducted in a limited manner. The 1/5 scale model was tested for resistance with a reduced beam in order to determine the effect of basic proportions on resistance. Two types of tests were carried out in order to determine the effectiveness of methods of propulsion other than tracks. Twin propellers were fitted into modified ring-kort nozzles in order to determine the propeller driven over-all efficiency. The propeller drive

units were arranged so the propellers were outboard of the model near the stern and could be pivoted so as to be entirely contained within the over-all vehicle dimensions when not in use. Also, the model was partially track propelled and towed in order to determine the thrust necessary from any auxiliary propulsion system at various speeds.

TEST CONFIGURATIONS

I Track Propulsion

Three bow shapes and three stern shapes were fitted in attempts to improve the basic hydrodynamic characteristics of the hull. One primary area of interest was the flow around the bow. The geometric effect of the bow and stern changes was to vary the longitudinal center of buoyancy of the vehicle with essentially the same length. Bow and stern planes were fitted to observe the changes in the flow pattern about the ends of the vehicle.

Many modifications were made to the track enclosures in attempts to reduce hydrodynamic losses. Two types of side skirts were fitted on the basis of previous experience with track vehicles. Bow fenders were fitted in order to reduce forward flow from the track return channels.

Because it appeared desirable to reduce the amount of water entrained in the track return channels, air was pumped into these enclosures. In a continued attempt to reduce water flow within the return channels several types of contravanes of various lengths were fitted behind the tracks. Also, stern baffles were tested as an alternative to the contravanes.

Three types of track grousers were used; the first were of normal size and shape; the second were longer than the first but of the same width; the third were of the same length as the first but wider. These third grousers were tried at two angles of entrance and two angles of exit.

The various model configurations were tested at prototype

displacements of from 39,000 pounds to 59,000 pounds. The static trim range was from 2.4 degrees bow up to 1.0 degree bow down.

The test procedure was to vary one or two items at a time to determine the relative effectiveness of the specific components. When the item was found to be beneficial and practical it was incorporated into the basic vehicle. When the item was detrimental it was discarded. Thus, certain bow and stern shapes, side skirts, grousers, etc., may appear only early in the test program. Other innovations were introduced later in the test program and were adopted in succeeding tests. Because the design weight was changed at times during the test program certain tests were repeated at different displacements. Specific details regarding the design and hydrodynamic features of the many innovations tested are presented in the Chrysler Corporation report of this test program.

The track propelled model was also tested in a partially propelled-partially towed condition. The purpose of this test was to measure the force necessary to achieve a speed at only partial track propulsion. This force would be furnished by some auxiliary means of propulsion.

II Propeller Propulsion

One test is reported with propeller propulsion. Some difficulty was experienced in the model drive system, which for simplicity was different than the drive proposed for the prototype. Therefore, a wake wheel test was run to confirm the wake derived from the propulsion test.

III Resistance Tests

A. Track propulsion model

This model was tested at one displacement with the grousers exposed and with the grousers covered to simulate tracks without grousers designed for water propulsion. Also, one purpose of these tests was to compare the resistance of the several bows and sterns.

B. Propeller propulsion model

This model configuration was tested at two displacements with the tracks covered and with them exposed. This configuration varied from that in "A" above in that the stern quarters were modified to admit the retracting twin propellers. Tests were conducted with and without bow fenders.

TEST METHOD

A. DHP tests: In these tests the model and the towing carriage were accelerated to a predetermined speed. The model was released and power applied to the tracks (or propellers) until the speed of the model matched the speed of the carriage. The model was restricted only in yaw and side sway. Speed, torque, RPM, and trim angle were measured and the small variations in the recordings averaged over a short period of time. After each test the frictional torque losses in the drive system were measured and subtracted from the test data.

B. Resistance tests: Again, in these tests the model and the towing carriage were accelerated to a predetermined speed. The model, restricted as above, was released and the resistance measured and averaged.

C. Under propulsion tests: These tests were conducted in a manner similar to above. Resistance, torque, RPM, and speed were recorded.

D. Data Extrapolation

The resistance data of the model tests was expanded to full scale by multiplying by the cube of the scale ratio, or 91.125 for the 1/4.5 scale model and 125 for the 1/5 scale model. This procedure does not include a skin friction extrapolation correction but past experience has shown that for forms of this type the residual resistance is overwhelmingly the major portion of the total such that little accuracy is lost by ignoring the friction correction.

The model net delivered horsepower was expanded in a similar manner. Horsepower was multiplied by the 3.5 power of the scale ratio; that is the model torque was multiplied by the fourth power of the scale ratio and the model RPM by the inverse square root of the scale ratio in order to determine the prototype values.

The trim angle of the model was taken as the trim angle of the prototype.

It was suggested that an estimate be made in the probable error of the data obtained. The model speed is very accurately determined, with a probable maximum error of 1/10 of one per cent. The resistance is measured with a probable maximum error of one per cent. The torque and RPM are measured with a probable maximum error of two per cent. These figures are estimates for an individial data point. When sufficient model data has been obtained throughout the speed range, this data is plotted and a fair curve drawn. These fair curves are used in the extrapolation procedure. In this manner any possible measurement error is reduced considerably. We consider the probable measurement error to be small relative to the uncertainty in extrapolation procedure, about which so little is known, since no reliable full scale data is presently available.

During the vast majority of the seventy-five tests reported within, an engineer from Chrysler Corporation was present either as an observer or an an assistant to the model basin personnel. This representative was responsible for the nature of the test program and the order in which tests were conducted while the model basin personnel were responsible

for the quality and quantity of the data obtained. Representatives of Chrysler Corporation and the Laboratory frequently discussed the progress of the program and the possible merits of various configurations.

Following is a description of each of the tests reported herein. These descriptions should be used in conjunction with the graphical data presented in order to identify and compare various configurations. The tests are numbered 1 through 75 in the two sections.

TRACK PROPULSION TESTS

Test No.	
1	Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No bow plane, stern plane, bow fenders, baffles, skirts, or contravanes were used. Tracks fitted with No. 1 grousers.
2a	Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No bow plane, stern plane, bow fenders, baffles, or contravanes used. Tracks fitted with No. 1 grousers and side skirts designated No. 1 secured over return channel.
2b	Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. Same configuration as test 2a except model making sternway.
3	Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No bow fenders, baffles or contravanes used. Plane fitted on at the stern, No. 1 side skirts used and grousers No. 1 still on tracks; however, no bow plane was used.
4	Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No bow fenders, baffles or contravanes. Bow plane No. 1 installed; stern plane, side skirts No. 1 and grousers No. 1 remain.
5a	Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No baffles, bow plane, or contravanes. Bow fenders No. 1 installed, stern plane and side skirts No. 1 remain. Tracks fitted with No. 1 grousers.
5b	Displacement = 45,000 lbs., static trim angle 2.4^{o} bow up--remainder of configuration the same as Test No. 5a.
6	Displacement = 45,000 lbs., 0.6 bow up static trim angle, with bow & stern No. 1. No contravanes or baffles. Bow fenders No. 1, side skirts No. 1, and stern plane were removed. Grousers No. 1 were on the tracks.
7	Displacement = 45,000 lbs., 1.5^{o} bow up static trim angle, bow & stern No. 1. Bow fenders No. 1, side skirts No. 1, no contravanes, stern baffles or planes.
8	Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No bow plane, stern plane or contravanes. Stern baffles No. 1 installed, bow fenders No. 1, side skirts No. 1 and grousers No. 1 with air injected into the return channel of the tracks.
9	Displacement = 45,000 lbs., 0^{o} static trim angle, with bow and stern No. 1. No bow plane, stern plane or contravanes. Bow fenders No. 1, stern baffles No. 1, side skirts No. 1, and No. 1 grousers on tracks.

10 Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No contravanes or bow plane. Stern plane, bow fenders No. 1, stern baffles No. 1, side skirts No. 1 and No. 1 grousers on tracks used with air injected into return channels.

11 Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No bow plane or contravanes. Stern plane, bow fenders No. 1, stern baffles No. 1, side skirts No. 1 used.

12 Displacement = 45,000 lbs., 0^{o} static trim angle with bow & stern No. 1. No planes or stern baffles were used. Contravanes were installed in the lower position; side skirts No. 1, bow fenders No. 1, and No. 1 grousers on tracks were used. Contravanes fitted with lips on ends.

13 Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No bow or stern plane or baffles. Bow fenders No. 1, side skirts No. 1. Contravanes in lower position, and grousers of type No. 1 on tracks.

14 Displacement = 45,000 lbs., 0^{o} static angle of trim, with bow & stern No. 1. No stern baffles, stern plane or bow plane used. Side skirts No. 1, bow fenders No. 1, contravanes set in both upper and middle positions, and grousers No. 1 used on tracks.

15 Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No stern plane, bow plane, or stern baffle used. Bow fenders No. 1, side skirts No. 1, contravanes in upper position, and tracks fitted with No. 1 grousers.

16 Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No bow plane, stern plane or stern baffles were used. Side skirts No. 1, bow fenders No. 1, both upper and lower contravanes, and grousers No. 1 on tracks.

17 Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 1. No bow plane or stern plane. Contravanes in both upper & lower positions. Bow fenders No. 1, side skirts No. 1, and No. 1 grousers on tracks.

18 Displacement = 45,000 lbs., 0^{o} static trim angle, with bow No. 2 & stern No. 1. No planes, baffles, fenders, contravanes, or side skirts used. Grousers No. 1 used on tracks.

19 Displacement = 45,000 lbs., 0^{o} static trim angle, with bow & stern No. 2. Side skirts No. 1, bow fenders designated No. 2, and stern baffles No. 2 were installed; lower contravane used, but no planes. Tracks fitted with No. 1 grousers.

20 Displacement = 45,000 lbs., 0° static trim angle, with bow No. 2 & stern No. 3. Side skirts No. 1, bow fenders No. 2, stern baffles No. 2, lower contravanes. No planes, tracks used No. 1 grousers.

21 Displacement = 45,000 lbs., 1.5° bow up static trim angle, with bow No. 2 & stern No. 3. No bow or stern plane. Bow fenders No. 3, side skirts No. 1, stern baffles No. 2, lower contravanes and No. 1 grousers on the tracks.

22 Displacement = 59,000 lbs., 1.5° bow up static trim angle, with bow No. 2 & stern No. 3. Side skirts No. 1, lower contravanes, stern baffles No. 2, bow fenders No. 2 & grousers No. 1 still remain. No bow or stern plane.

23 Displacement = 59,000 lbs., 1.0° bow up static trim angle, with bow No. 2 & stern No. 3. Side skirts No. 1, lower contravanes, stern baffles No. 2, bow fenders No. 3 & No. 1 grousers on tracks. No bow or stern plane.

24 Displacement = 59,000 lbs., 0° static trim angle with bow No. 2 & stern No. 3. No bow or stern plane. Bow fenders No. 2, stern baffles No. 2, side skirts No 1, lower contravanes, and grousers No. 1 on tracks.

25 Displacement = 59,000 lbs., 0° static trim angle, with bow No. 2 & stern No. 3. No planes were used. Bow fenders No. 2, stern baffles No. 2. Lower contravanes, side skirts No. 1 and No. 1 grousers used on the tracks.

26 Displacement = 45,000 lbs., 0° static angle of trim, with bow No. 1 & stern No. 2. No bow plane or stern plane or stern baffles used. Side skirts No. 1, bow fenders changed to No. 1, and lower contravanes. Tracks fitted with No. 1 grousers.

27 Displacement = 45,000 lbs., 0° static trim angle, with bow No. 2 & stern No. 2. No bow plane or stern plane, or stern baffles, Side skirts No. 1, bow fenders changed back to No. 2, upper contravanes. Tracks with No. 1 grousers.

28 Displacement = 45,000 lbs., 1.0° static trim angle, with bow No. 2 & stern No. 2. No bow plane or stern plane, or stern baffles used. Bow fenders No. 2, side skirts No. 1 and contravanes in middle position used with No. 1 grousers on tracks.

29 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 2. No stern baffles, bow plane or stern plane. Bow fenders No. 2, side skirts No. 1, middle contravanes, grousers on tracks labeled No. 2. It should be noted that this test was only partially run, thus plot presented was plotted following the slope of the curves of similar tests through the data points.

30 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 2. No stern plane, bow plane or stern baffles used. Bow fenders No. 2, upper contravanes, side skirts No. 1, and No. 1 grousers on tracks. It should be noted that this test was only partially run, thus plot presented was plotted following the slope of the curves of similar tests, through the data points.

31 Displacement = 45,000 lbs., 0° static trim angle, with bow & stern No. 2. No stern baffles, bow plane or stern plane. Bow fenders No. 2, upper contravanes, side skirts No. 1, and tracks with No. 1 grousers. Side skirt windows open $\frac{1}{2}$" forward.

32 Displacement = 45,000 lbs., 0° static trim angle, with bow & stern No. 2. Bow fenders No. 2, upper contravanes, No. 1 side skirts with window open 1" forward, and tracks fitted with No. 1 grousers. No bow or stern plane, or stern baffles used.

33 Displacement = 45,000 lbs., 0° static trim angle, with bow & stern No. 3. No bow or stern plane used. Contravanes in middle position, side skirts No. 2, bow fenders No. 2. Grousers on tracks type No. 1. Stern baffle slightly open.

34 Displacement = 45,000 lbs., 0° static trim angle, with bow & stern No. 3. No bow or stern plane. No. 2 bow fenders, No. 2 side skirts, contravanes in middle position, No. 1 grousers on tracks. Stern baffle openings closed.

35 Displacement = 45,000 lbs., 0° static trim angle, with bow No. 2 & stern No. 1. No stern plane or baffles. Bow plane type No. 2 installed, bow fenders No. 2, side skirts No. 2, contravanes in middle position and tracks fitted with No. 1 grousers.

36 Displacement = 45,000 lbs., 0° static trim angle, with bow No. 2 & stern No. 1. No stern baffles, stern plane, or bow plane. Bow fenders No. 2, side skirts No. 2, No. 1 grousers on tracks. Test conducted while vessel is making sternway.

37 Displacement = 45,000 lbs., 0° static trim angle, with bow No. 2 stern No. 1. No planes or baffles used. Side skirts No. 2, bow fenders No. 2, middle contravanes, and No. 1 grousers on tracks.

38 Displacement = 45,000 lbs., 1.0° static trim angle, with bow No. 2 stern No. 1. No planes or baffles. Bow fenders No. 2, side skirts No. 2, middle contravanes, and type No. 1 grousers on tracks.

39 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No stern baffles, bow plane, or stern plane. No. 2 side skirts, No.2 bow fenders, and middle contravanes. Track grousers changed to No. 2.

40 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No bow plane, stern plane, or baffles used. Bow fenders No. 2, side skirts No. 2, contravanes at stern seam and grousers No. 2 fitted to tracks.

41 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No stern baffles, bow or stern plane. Side skirts No. 2, bow fenders No. 2, and contravanes at the stern seam, with grousers type No. 1 returned to the tracks.

42 Displacement = 45,000 lbs., 0° static trim angle, with bow & stern No. 3. No bow or stern planes were used. Side skirts No. 2, bow fenders No. 2, and grousers No. 1 fitted to the tracks. This test is a repeat of test No. 34, with stern baffle openings closed.

43 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No stern plane or bow plane used. Side skirts No. 2, bow fenders No. 2, contravane angle changed and placed on the stern seam. Track grousers were type No. 1, and openings in the stern baffle were closed.

44 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No bow or stern plane used. No. 2 side skirts, No. 2 bow fenders, and contravanes were placed on the stern seam with an angle increase. Tracks fitted with grouser type No. 1, and the openings in the baffles were closed.

45 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No bow or stern plane. No. 2 bow fenders, No. 2 side skirts, contravanes fitted along the stern seam with another angle increase. Track grousers were type No. 1, and openings in the baffles were closed.

46 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No bow plane or stern plane used. Side skirts No. 2, and bow fenders No. 2, with the contravane height increased, and the angle of the vanes the same as in test No. 44. The openings in the baffles were closed and track grousers type No. 1.

47 Displacement = 50,119 lbs., 1.0° static trim angle, with bow & stern No. 3. No planes. Side skirts No. 2, bow fenders No. 2, contravanes same as in test No. 46, baffle openings closed, and track grousers were type No. 1.

48 Displacement = 45,000 lbs., 0° static trim angle, with bow & stern No. 3. No bow plane or stern plane used. Bow fenders No. 2, side skirts No. 2, contravanes the same as in test No. 44. Track grousers No. 1, and openings in baffles closed.

49 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No bow or stern plane used. Bow fenders No. 2, side skirts No. 2, 2 inches removed from the trailing edge of contravane, but the baffles and the grousers remain the same as before.

50 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No bow or stern plane used. Bow fenders No. 2, side skirts No. 2. Two additional inches removed from the trailing edge of contravane, grousers and baffles remain the same.

51 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No stern plane or bow plane used. No. 2 side skirts, No. 2 bow fenders, another inch removed from trailing edge of contravane, with grousers No. 1 on tracks, and baffle openings closed as before.

52 Displacement = 39,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No stern plane or bow plane used. Bow fenders No. 2, side skirts No.2, contravanes remain 5 inches short, and grousers No. 1 fitted to tracks, with openings in baffles closed.

53 Displacement = 39,000 lbs., negative 1.0° static trim angle, with bow & stern No. 3. No bow or stern plane used. Side skirts No. 2, bow fenders No. 2, baffle openings remain closed, tracks fitted with No. 1 grousers, and contravanes remain 5 inches short.

54 Displacement = 45,000 lbs., negative 1.0° static trim angle, with bow & stern No. 3. No bow or stern plane. Side skirts No. 2, bow fenders No. 2, track grousers No. 1, openings in baffles closed, and contravanes 5 inches short.

55 Displacement = 45,000 lbs., 1.0° static trim angle, with bow & stern No. 3. No bow plane or stern plane used. Bow fenders No. 2, side skirts No. 2, baffle openings remain closed, contravanes 5 inches short, and wide track grousers on tracks with a 35° angle of entrance. This test to be compared with test No. 51.

56 Displacement = 45,000 lbs., 2.0° static trim angle, with bow & stern No. 3. No bow or stern plane. No. 2 bow fenders, No. 2 side skirts, contravanes 5 inches short, wide track grousers used with a 7.5° angle of exit, and openings in baffles closed. This test also to be compared to test No. 51.

57 Displacement = 45,000 lbs., negative 1.0° static trim angle, with bow & stern No. 3. No planes used. Bow fenders No. 2, side skirts No. 2, contravanes 5 inches short, grousers wide with a 7.5° angle of exit, and baffle openings closed.

58 Displacement = 45,000 lbs., negative 1.0° static trim angle, with bow & stern No. 3, but stern fitted to square plan view. No planes used. No. 2 bow fenders, No. 2 side skirts, wide grousers with a 7.5° angle of exit, contravanes 5 inches short, and openings in baffles remain closed.

59 Displacement = 45,000 lbs., negative 1.0° static trim angle. Configuration the same as test No. 58, except model making sternway.

60 Displacement = 45,000 lbs., 1.0° static trim angle. Remainder of configuration the same as test No. 58, except model making sternway.

61 Displacement = 45,000 lbs., 1.0° static trim angle, Configuration the same as test No. 60, except model making headway.

62 Displacement = 45,000 lbs., negative 1.0° static trim angle, with bow & stern No. 3. No bow or stern plane. No. 2 side skirts, No. 2 bow fenders, contravanes 5 inches short, with a slight angle increase, baffle openings closed.

TRACK PROPULSION MODEL EFFECTIVE HORSEPOWER TEST DATA

63 Displacement = 45.000 lbs., 0° static trim angle, with bow & stern No. 2. Side skirts No. 2, contravanes, and track grousers exposed.

64 Displacement = 45,000 lbs., 0° static trim angle, with bow No. 2 & stern No. 1. Side skirts No. 2, and grousers covered.

65 Displacement = 45,000 lbs., 0° static trim angle, with bow & stern No. 3. Side skirts No. 2, and the grousers covered.

UNDER PROPULSION TEST DATA

66 Displacement = 45,000 lbs., 0° static trim angle, with bow & stern No. 2. Side skirts No. 2, contravanes, and track grousers exposed.

PROPELLER PROPULSION MODEL TESTS
DEVELOPED HORSEPOWER AND WAKE TESTS

67 Displacement = 50,000 lbs., 0° static trim angle, with bow No. 3 & stern No. 4. Side skirts No. 2, bow fenders No. 2, and grousers exposed.

68 Displacement = 50,000 lbs., 0° static trim angle, with bow No. 3 & stern No. 4. Side skirts No. 2, bow fenders No. 2, and grousers exposed.

69 Open water characteristics of the four bladed propellers used during propulsion tests.

EFFECTIVE HORSEPOWER TESTS

70 Displacement = 50,000 lbs., 0° static trim angle, with bow No. 3 & stern No. 4. Side skirts were type No. 2, and grousers were covered.

71 Displacement = 50,000 lbs., 0° static trim angle, with bow No. 3 & stern No. 4. Side skirts,& fenders No. 2, grousers exposed.

72 Displacement = 55,000 lbs., 0° static trim angle, with bow No. 3 & stern No. 4. Side skirts No. 2, and the grousers covered.

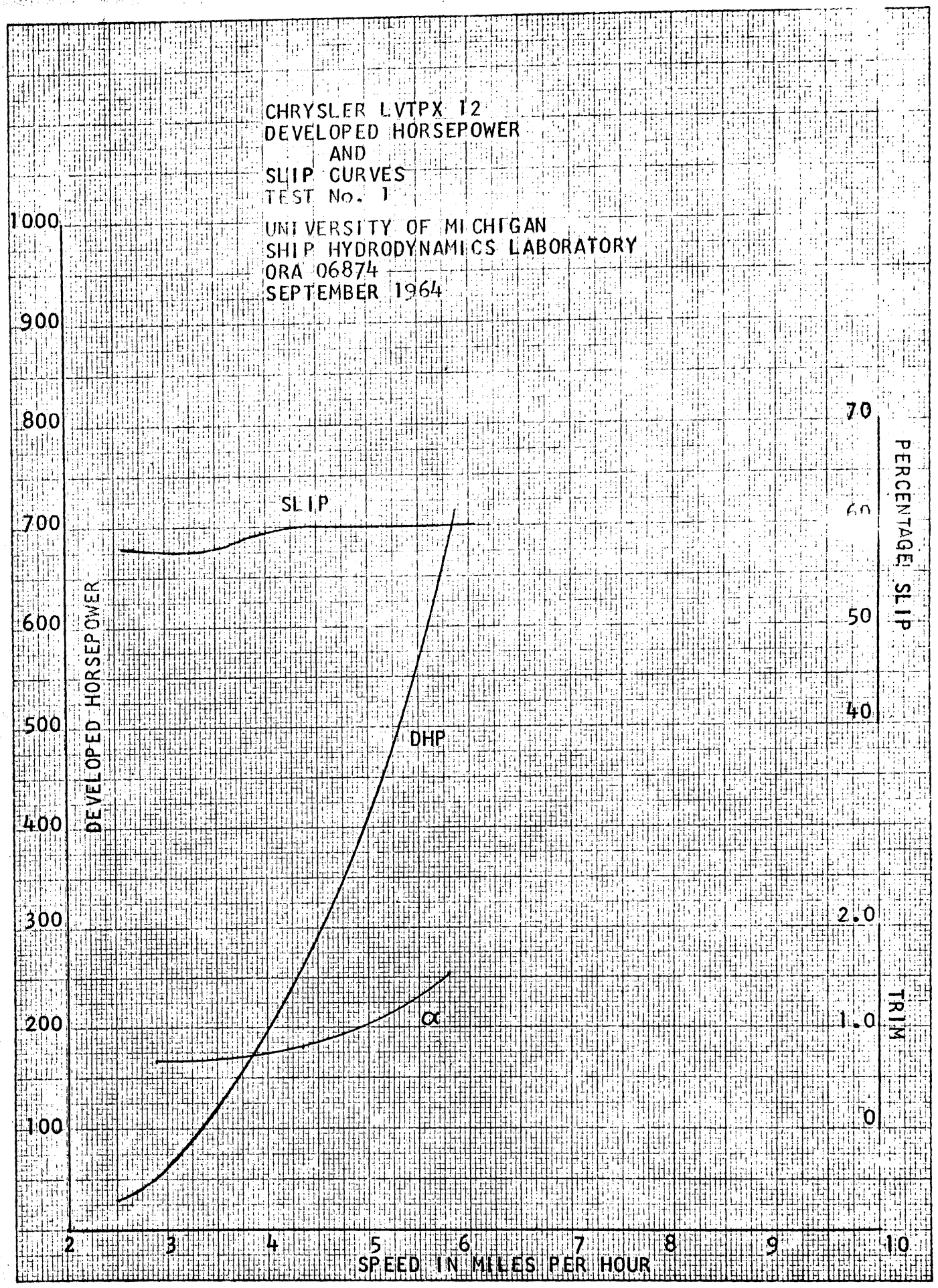
BLOCK MODEL TESTS
EFFECTIVE HORSEPOWER TESTS

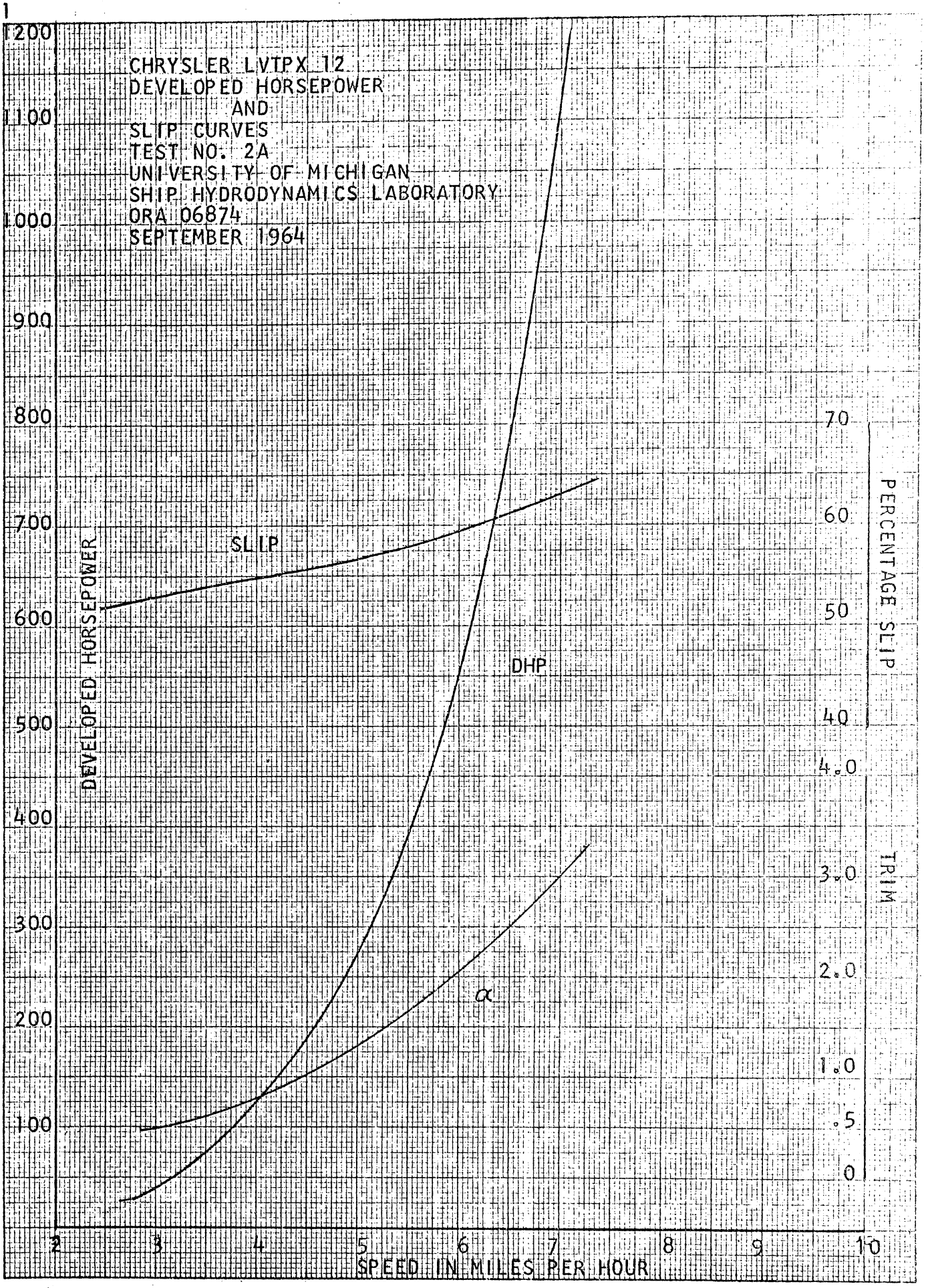
In the block model tests the data presented is from a model of the original configuration with the beam reduced 20%.

73 Displacement = 27,000 lbs..

74 Displacement = 35,000 lbs..

75 Displacement = 40,000 lbs..


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST No. 1
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
SEPTEMBER 1964
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
PERCENTAGE SLIP
70
50
40
2.0
1.0
0
TRIM
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 2A
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
SEPTEMBER 1964
DEVELOPED HORSEPOWER
1200
1100
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
PERCENTAGE SLIP
70
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50
40
4.0
3.0
2.0
1.0
.5
0
TRIM
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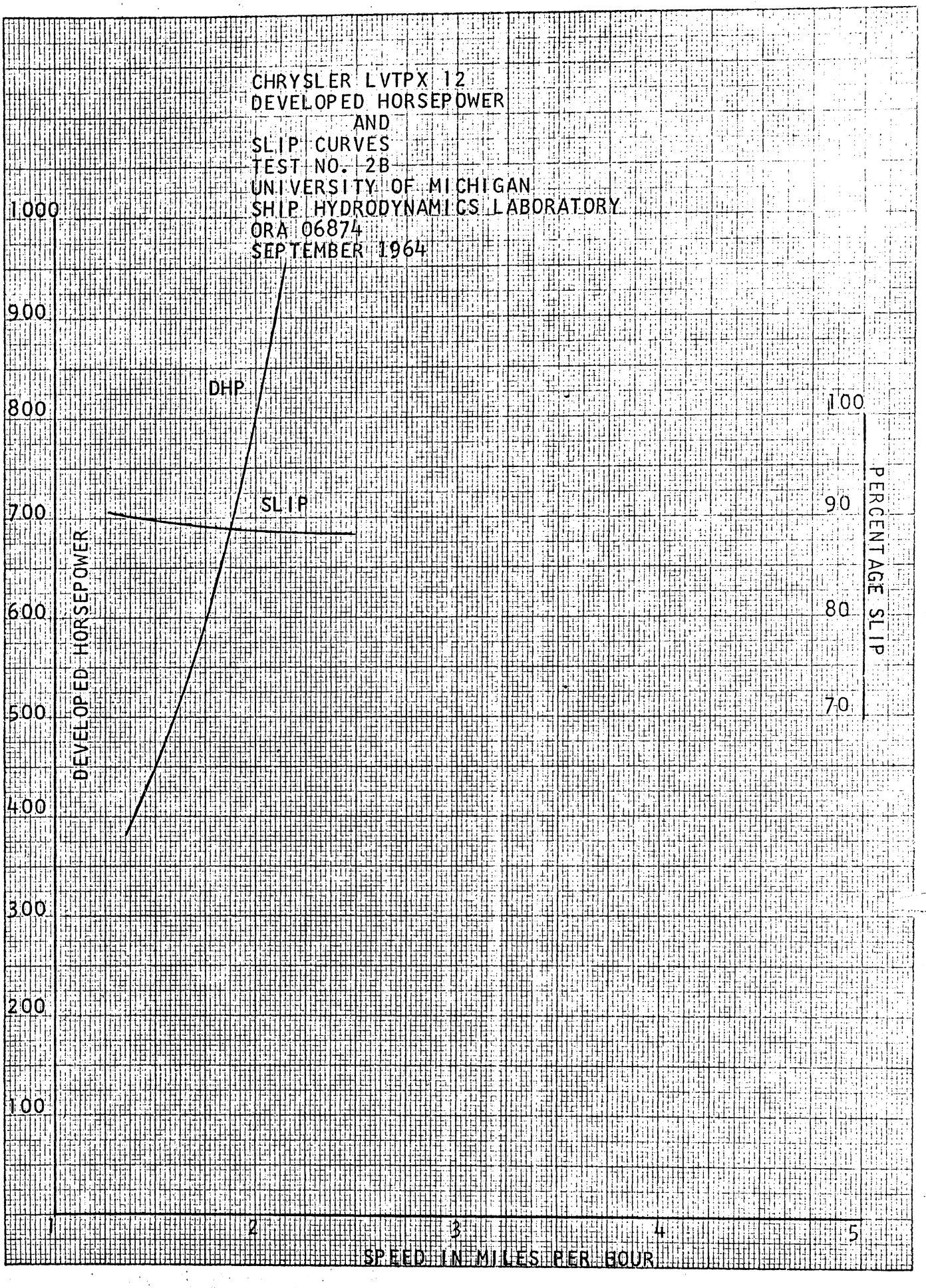
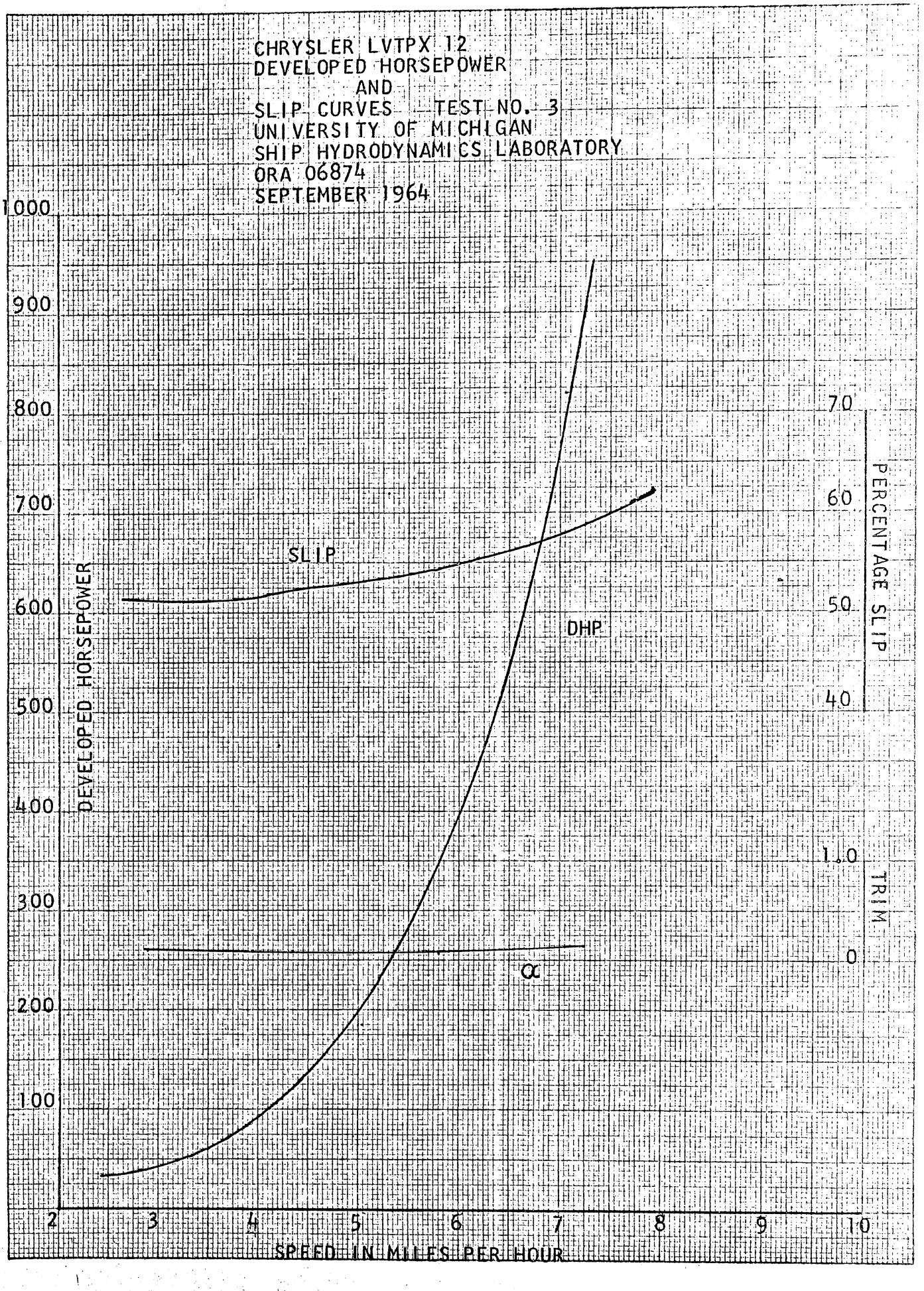
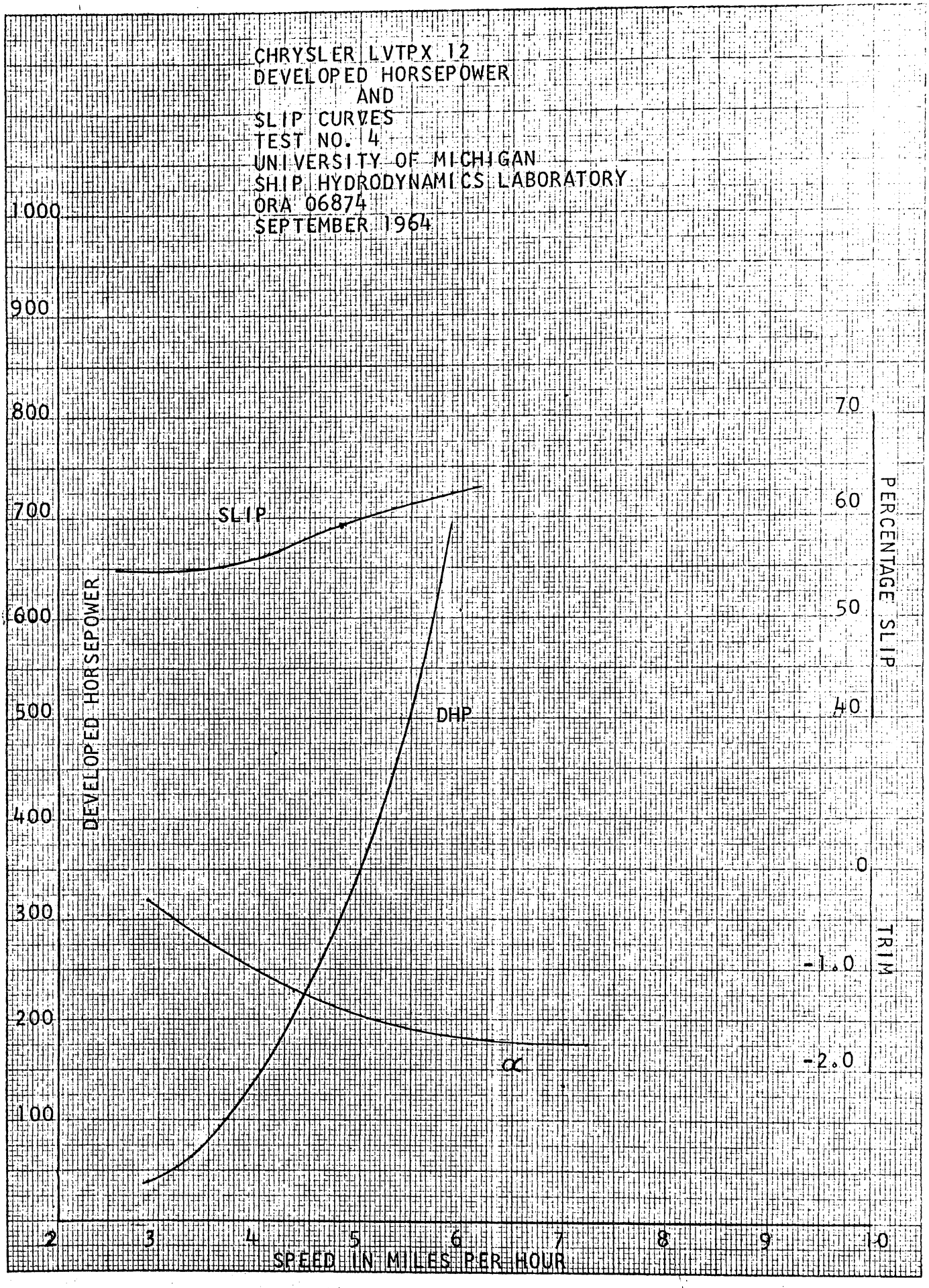
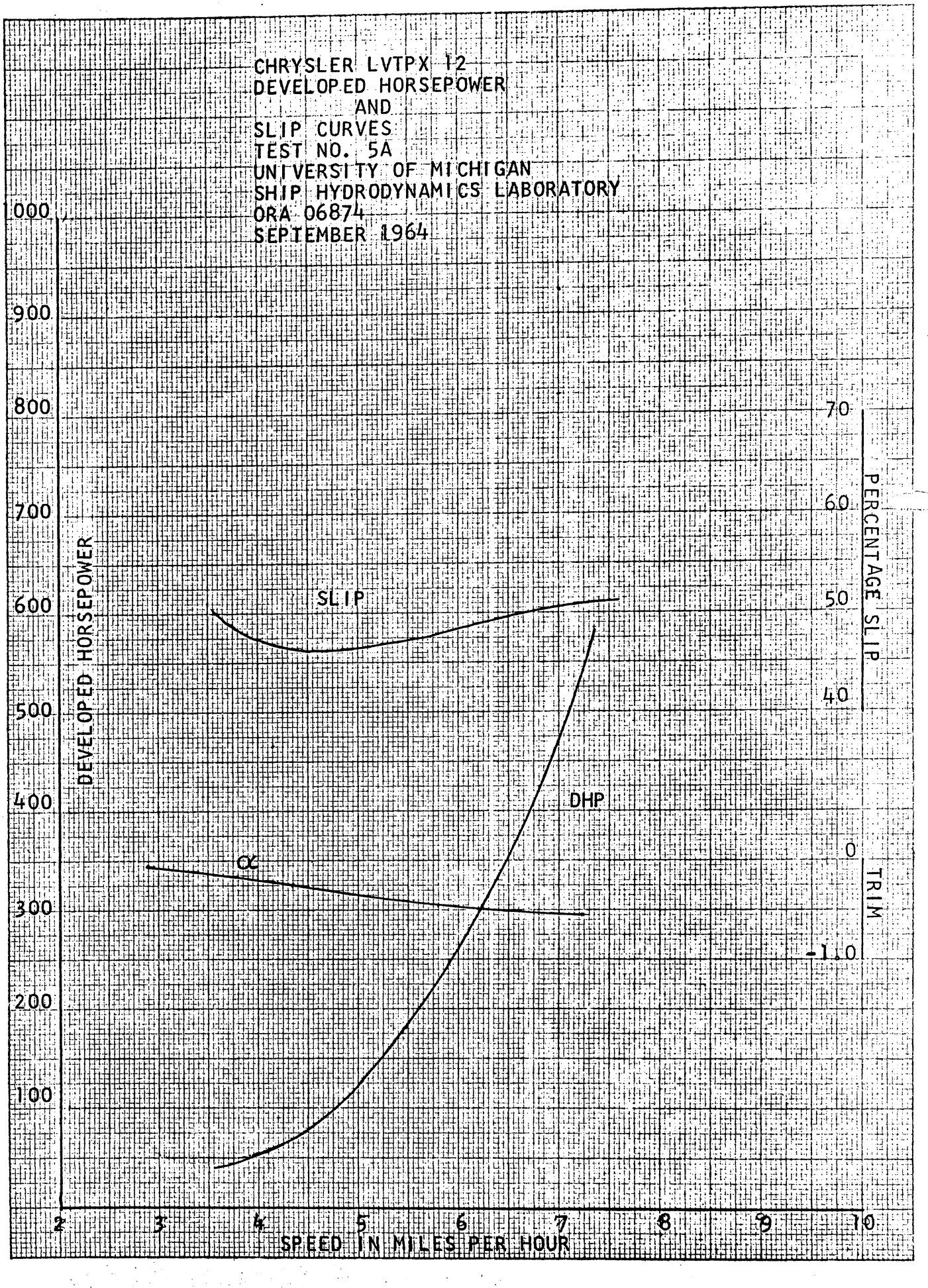
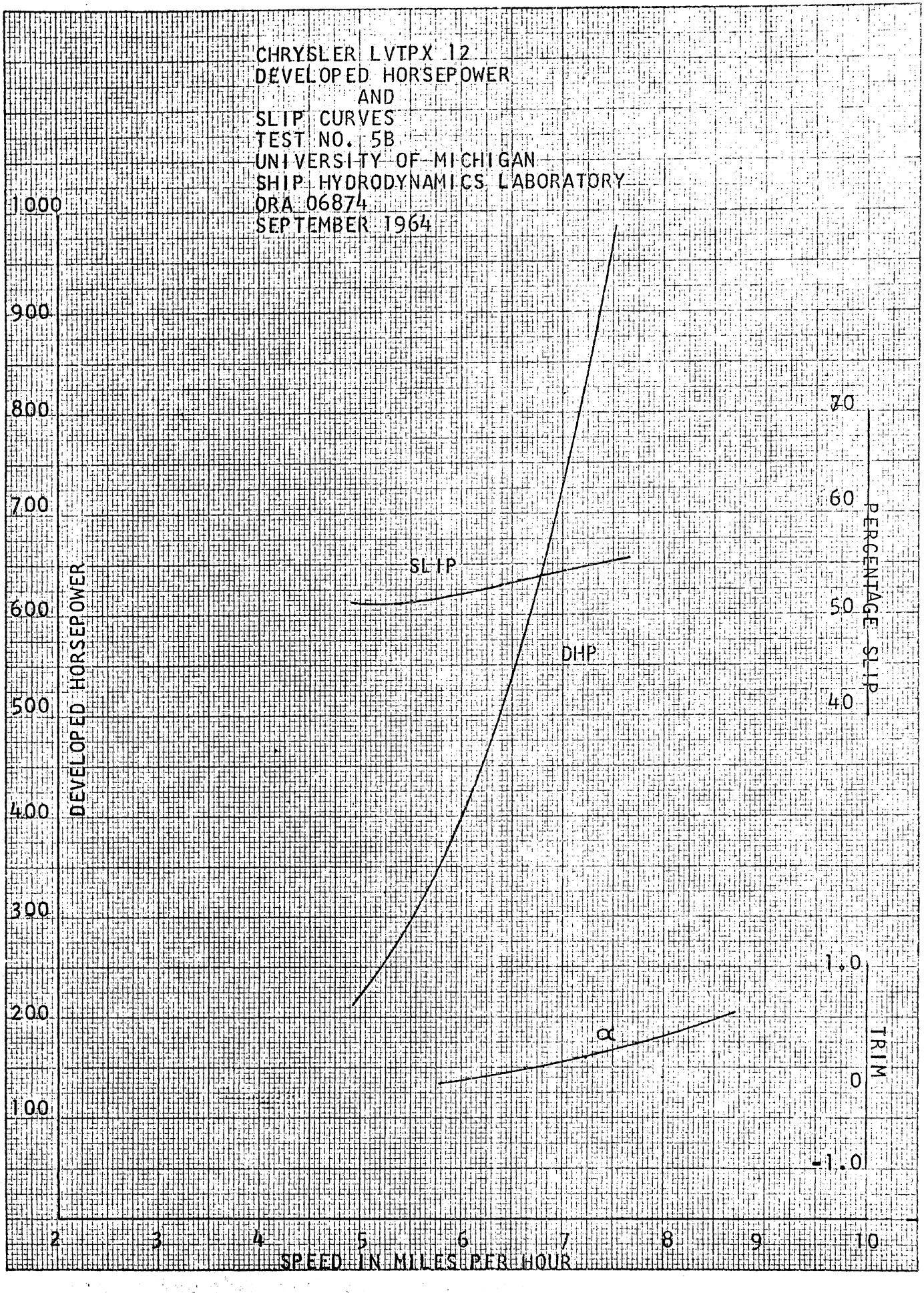
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

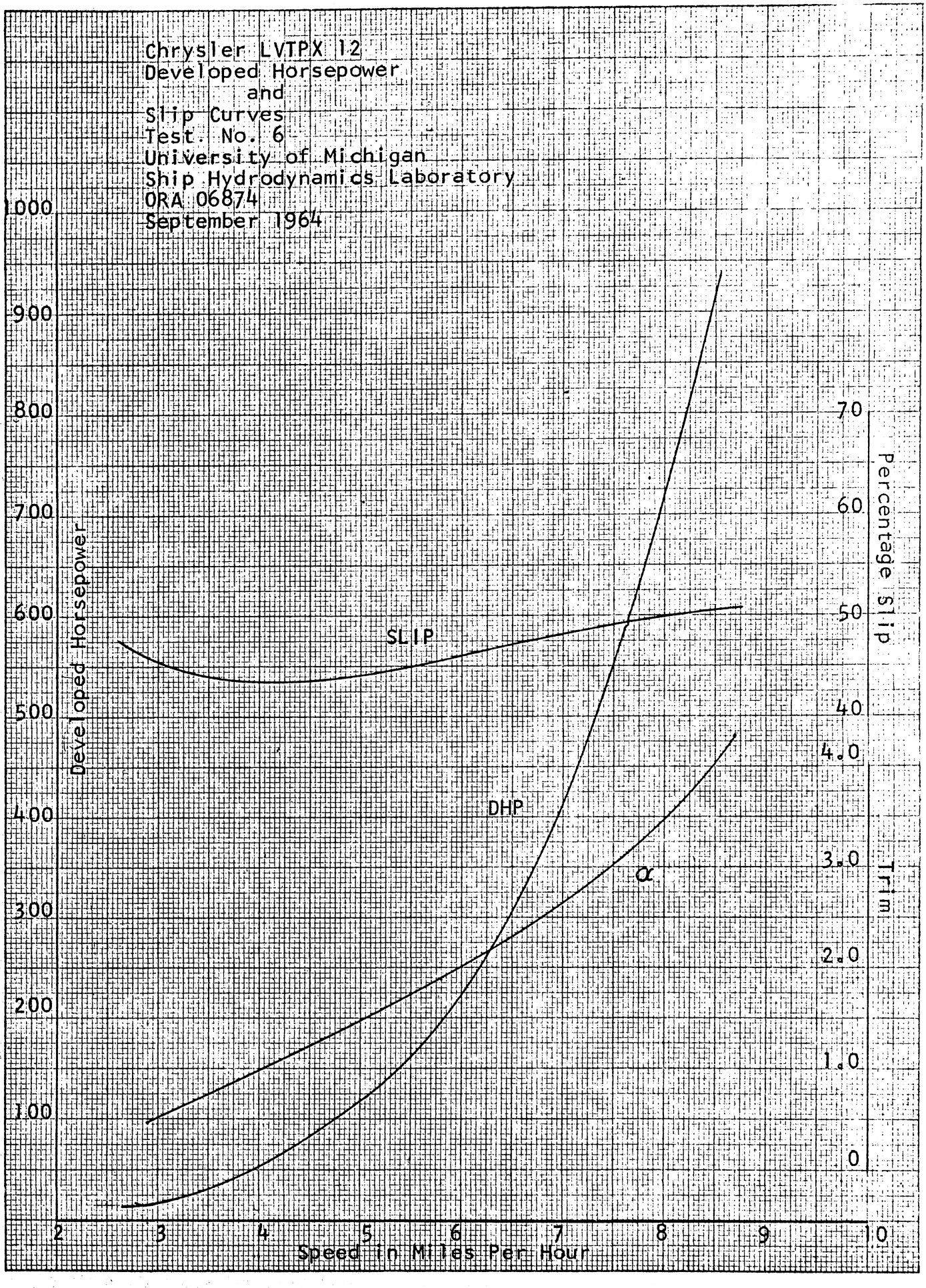

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 2B
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
SEPTEMBER 1964
DHP
SLIP
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
100
90
80
70
PERCENTAGE SLIP
1
2
3
4
5
SPEED IN MILES PER HOUR

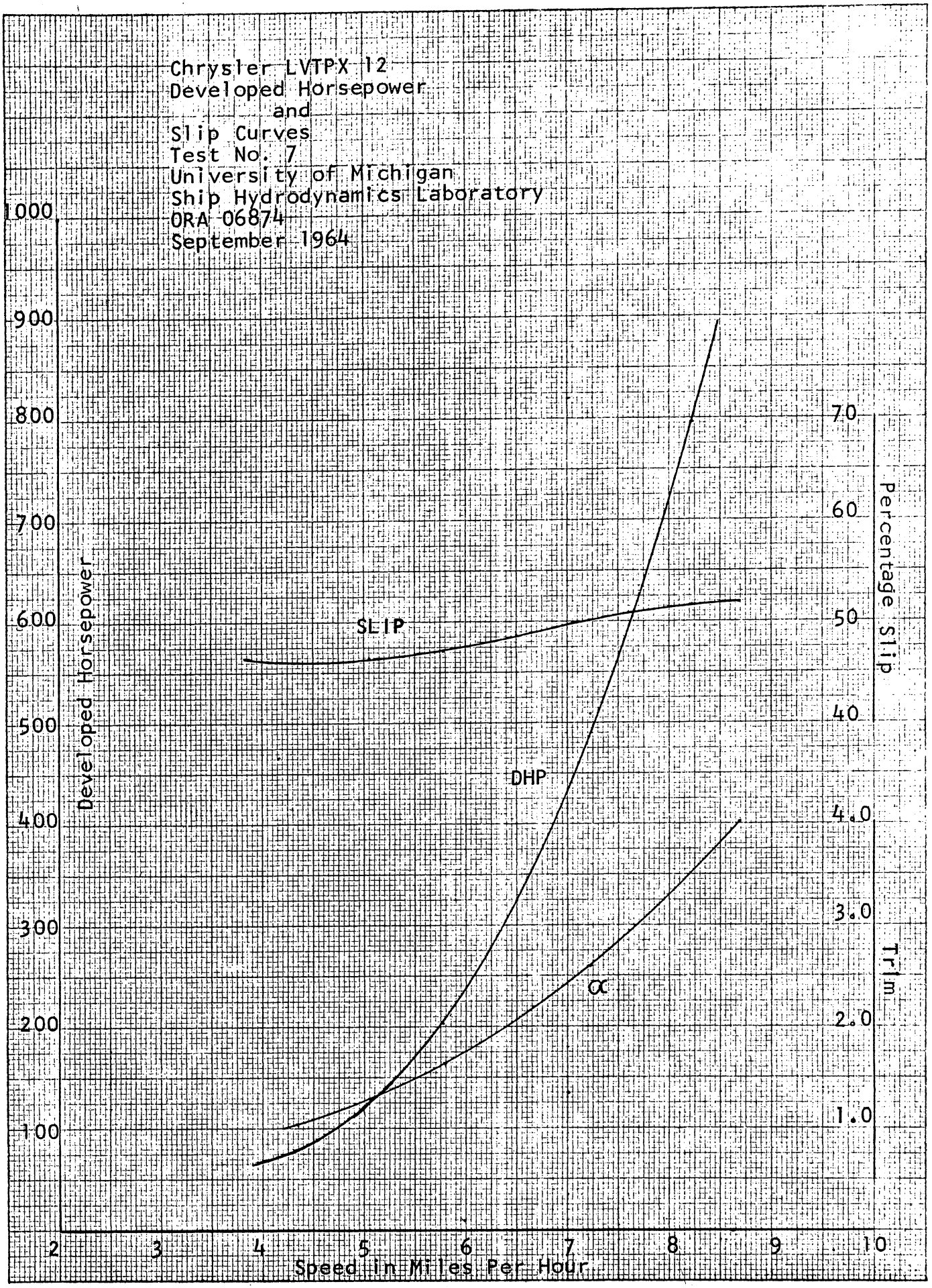

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES — TEST NO. 3
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
SEPTEMBER 1964
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
PERCENTAGE SLIP
70
60
50
40
TRIM
1.0
0
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

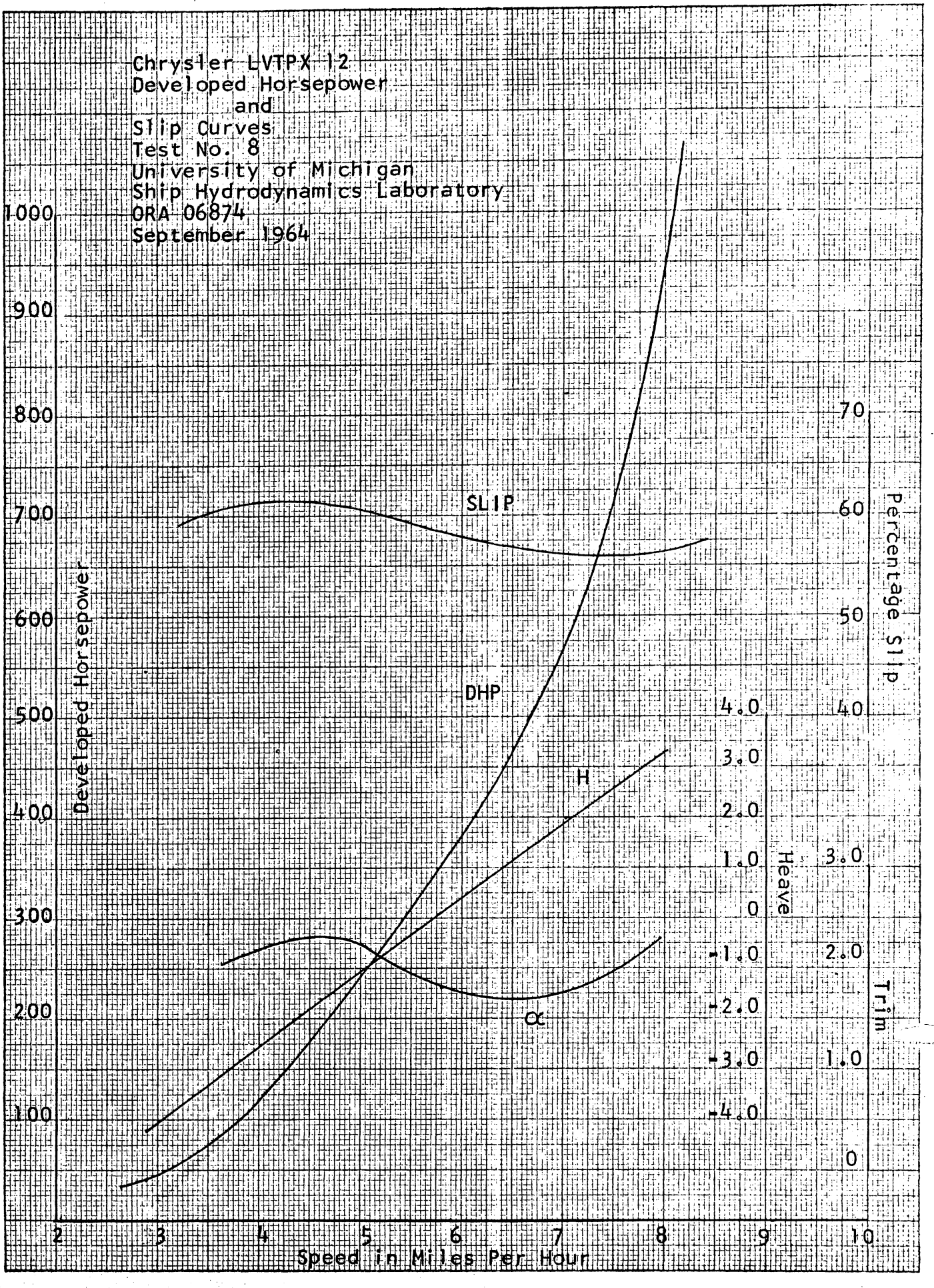

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 14
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
SEPTEMBER 1964
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
PERCENTAGE SLIP
70
60
50
40
0
TRIM
-1.0
-2.0
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

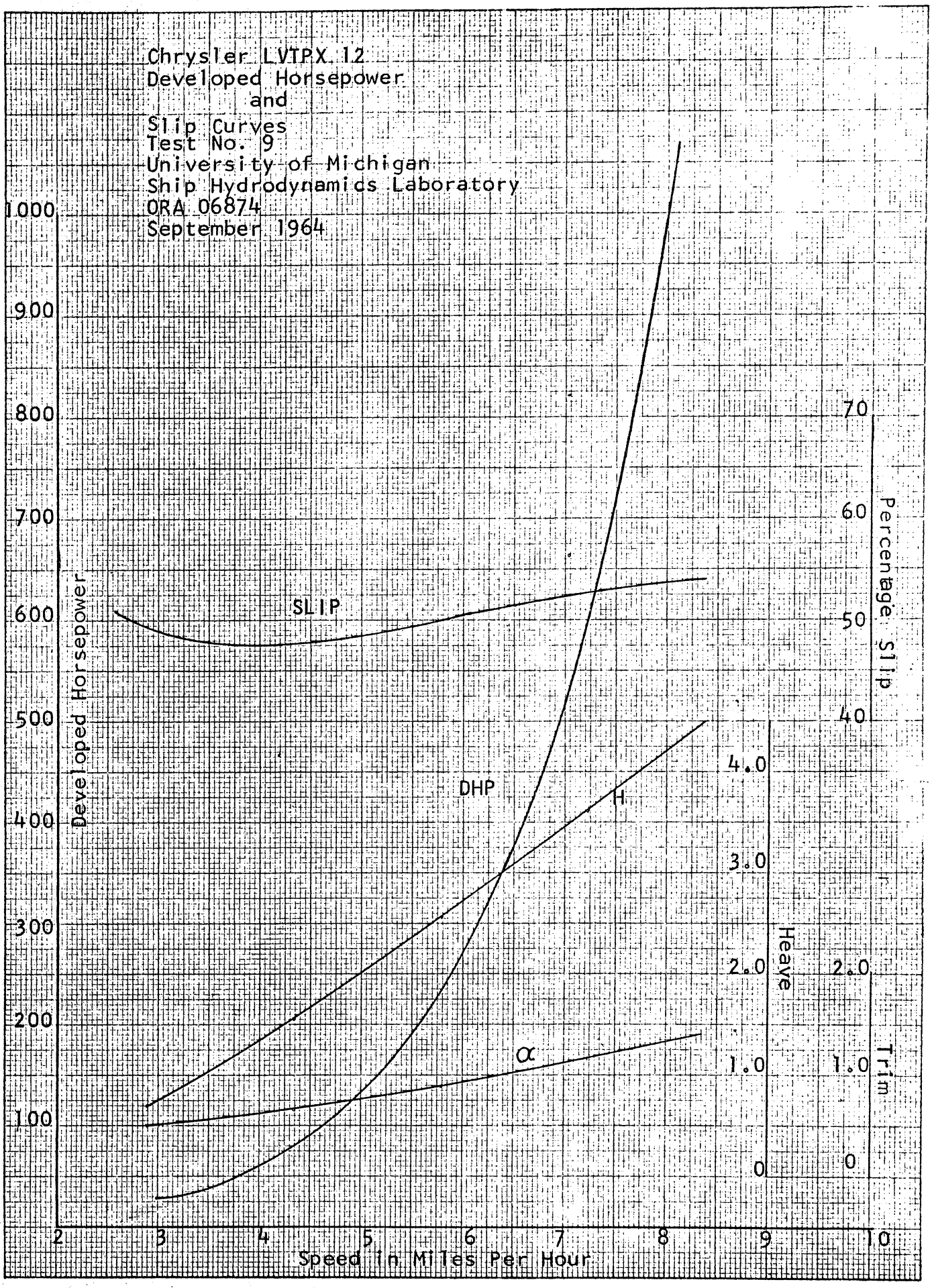

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 5A
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
SEPTEMBER 1964
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
PERCENTAGE SLIP
70
60
50
40
0
TRIM
-1.0
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

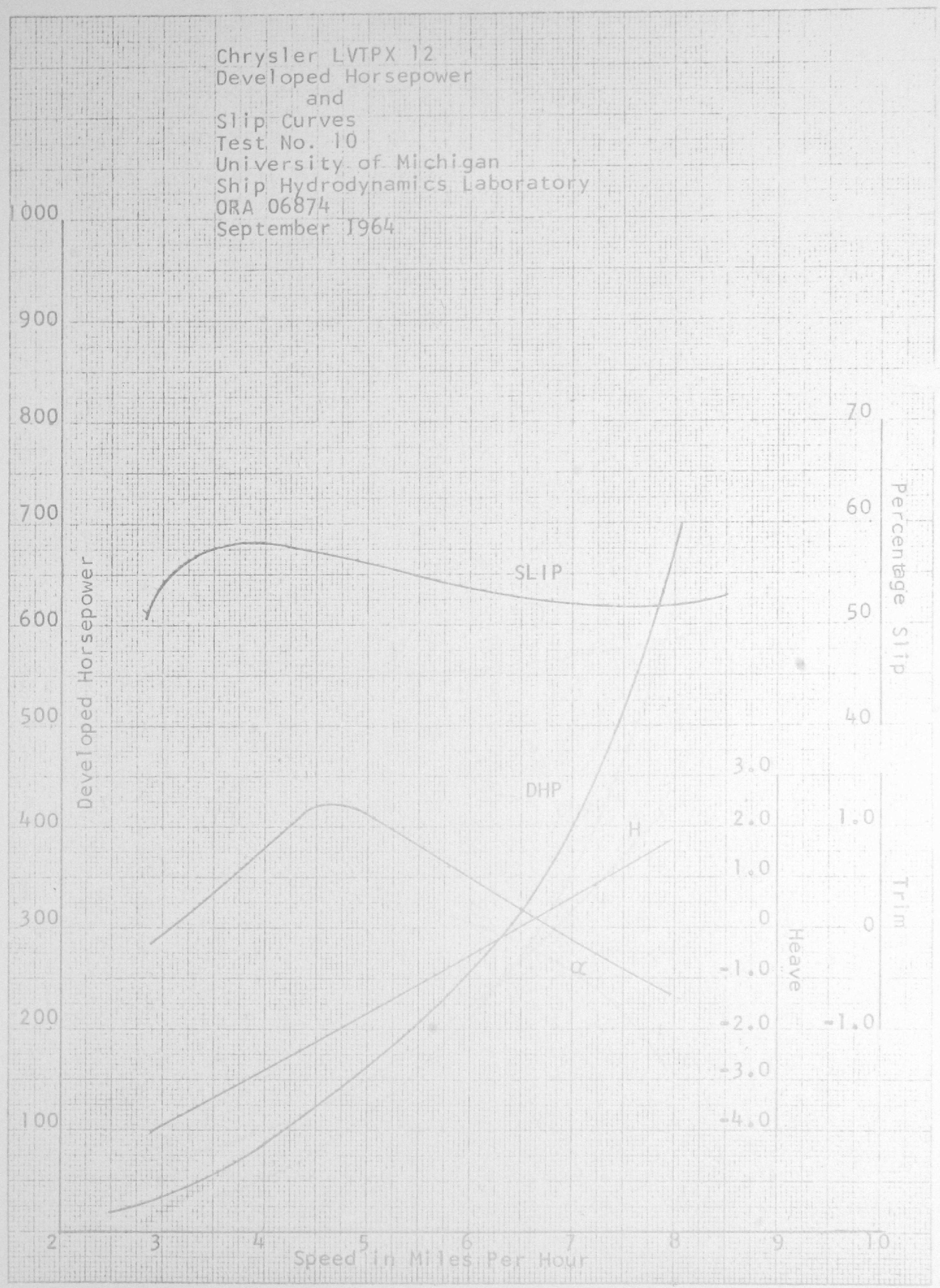

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 5B
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
SEPTEMBER 1964
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
PERCENTAGE SLIP
70
60
50
40
TRIM
1.0
0
-1.0
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

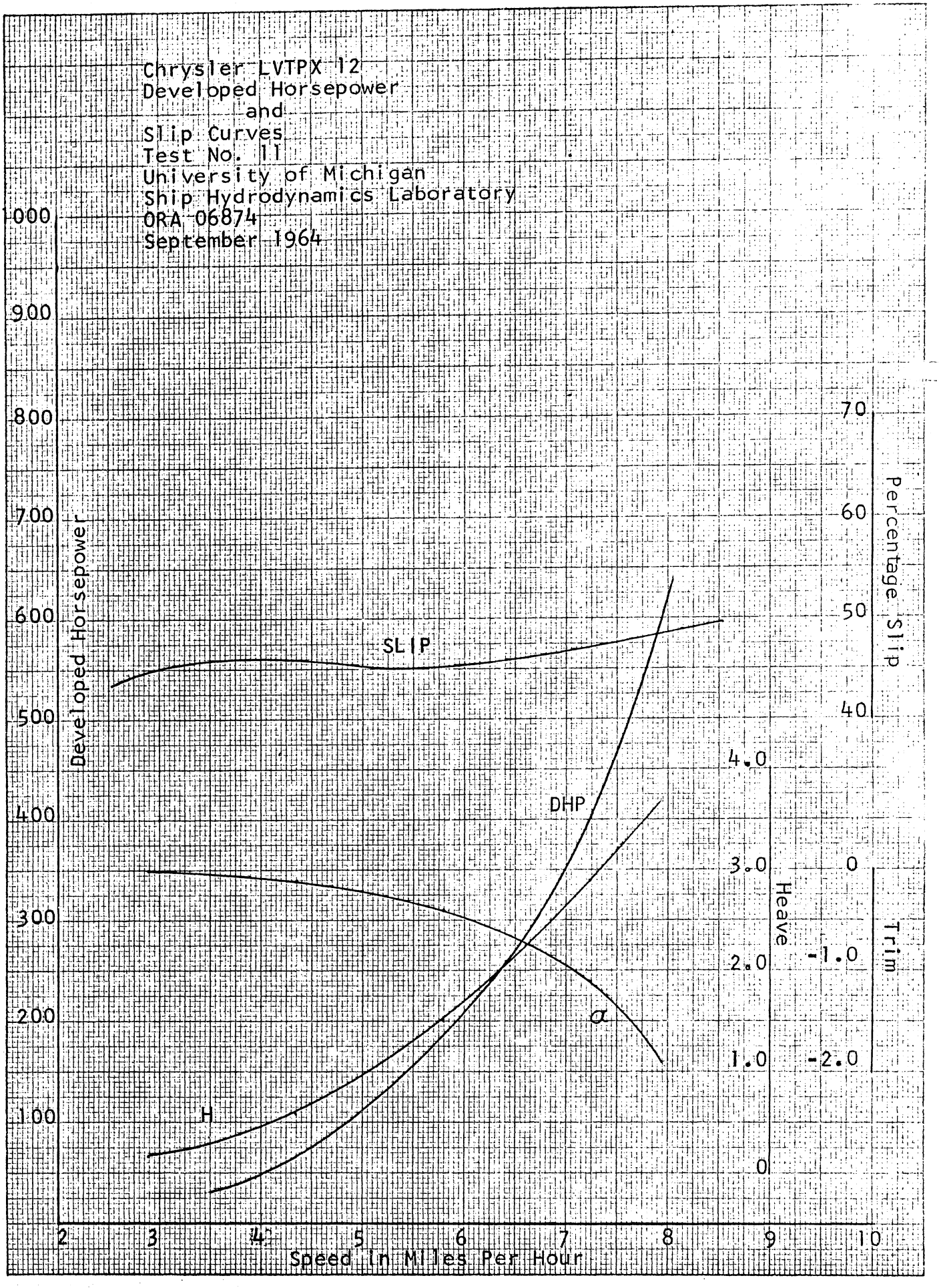

Chrysler LVTPX 12
Developed Horsepower
and
Slip Curves
Test No. 6
University of Michigan
Ship Hydrodynamics Laboratory
ORA 06874
September 1964
Developed Horsepower
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
Percentage Slip
70
60
50
40
4.0
3.0
2.0
1.0
0
Trim
2
3
4
5
6
7
8
9
10
Speed in Miles Per Hour

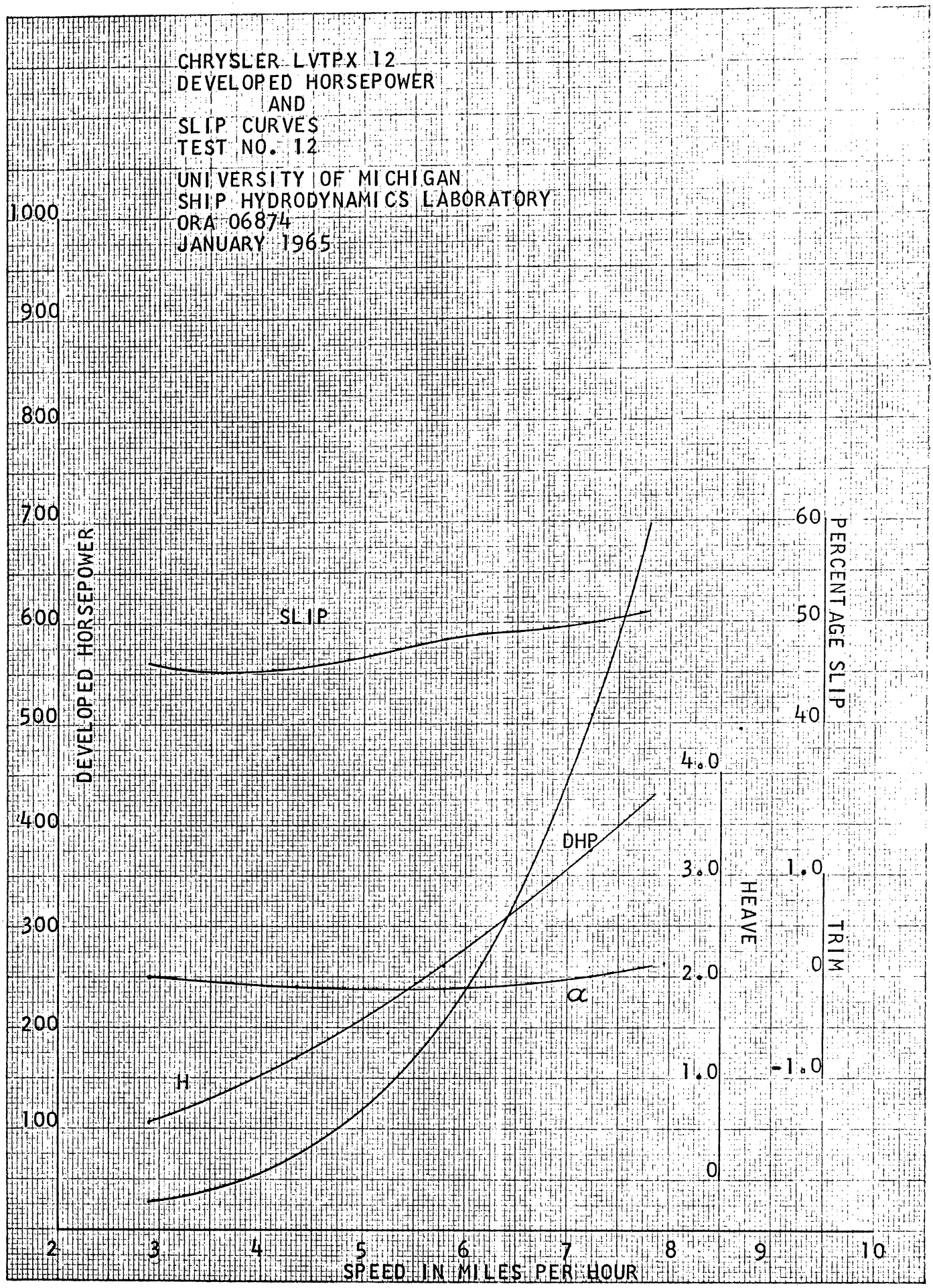

Chrysler LVTPX 12
Developed Horsepower
and
Slip Curves
Test No. 7
University of Michigan
Ship Hydrodynamics Laboratory
ORA 06874
September 1964
1000
900
800
700
600
500
400
300
200
100
Developed Horsepower
SLIP
DHP
α
70
60
50
40
4.0
3.0
2.0
1.0
Percentage Slip
Trim
2
3
4
5
6
7
8
9
10
Speed in Miles Per Hour

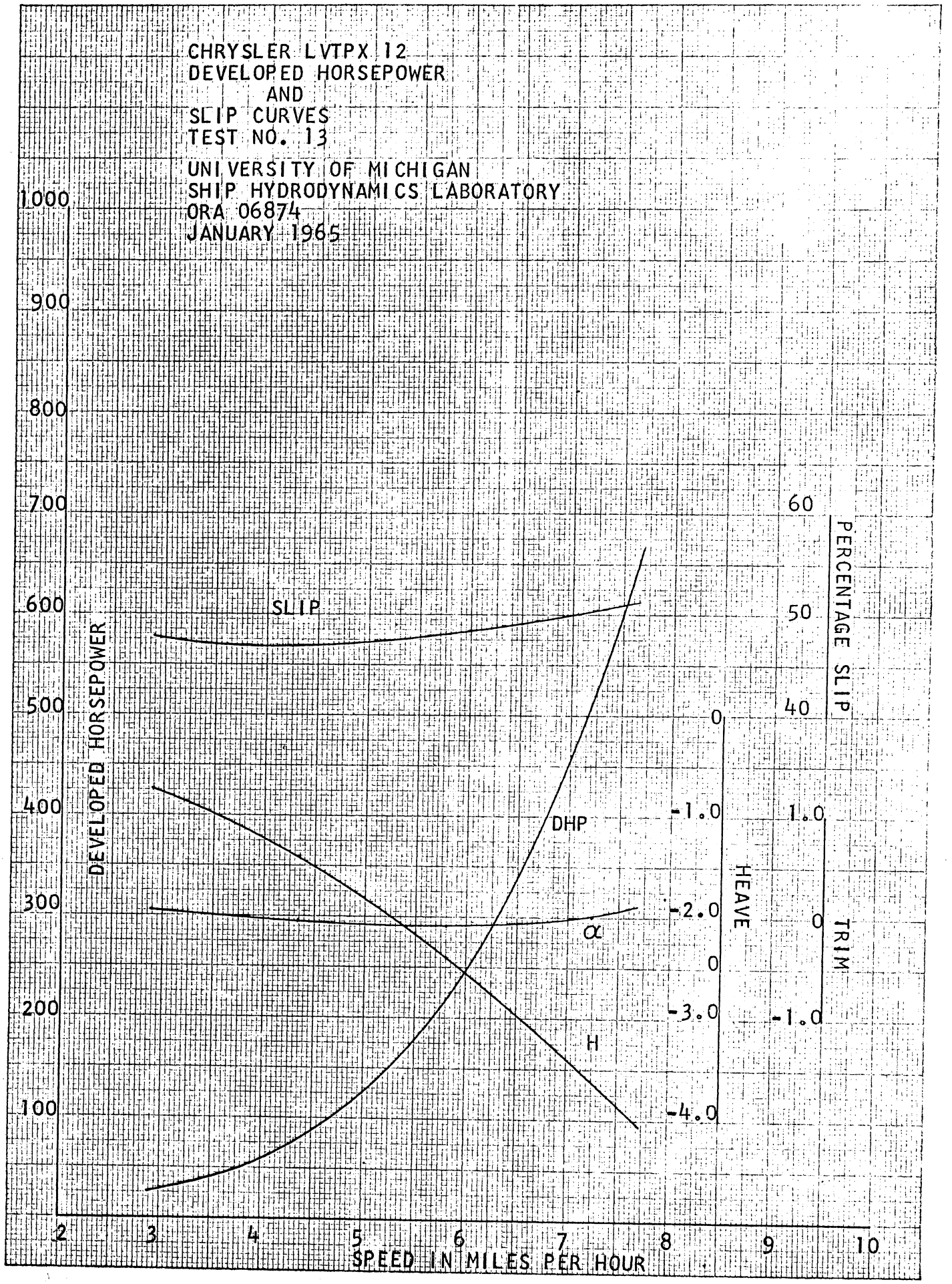

Chrysler LVTPX-12
Developed Horsepower
and
Slip Curves
Test No. 8
University of Michigan
Ship Hydrodynamics Laboratory
ORA 06874
September 1964
1000
900
800
700
600
500
400
300
200
100
Developed Horsepower
SLIP
DHP
H
α
70
60
50
40
3.0
2.0
1.0
0
-1.0
-2.0
-3.0
-4.0
Heave
Percentage Slip
Trim
2
3
4
5
6
7
8
9
10
Speed in Miles Per Hour

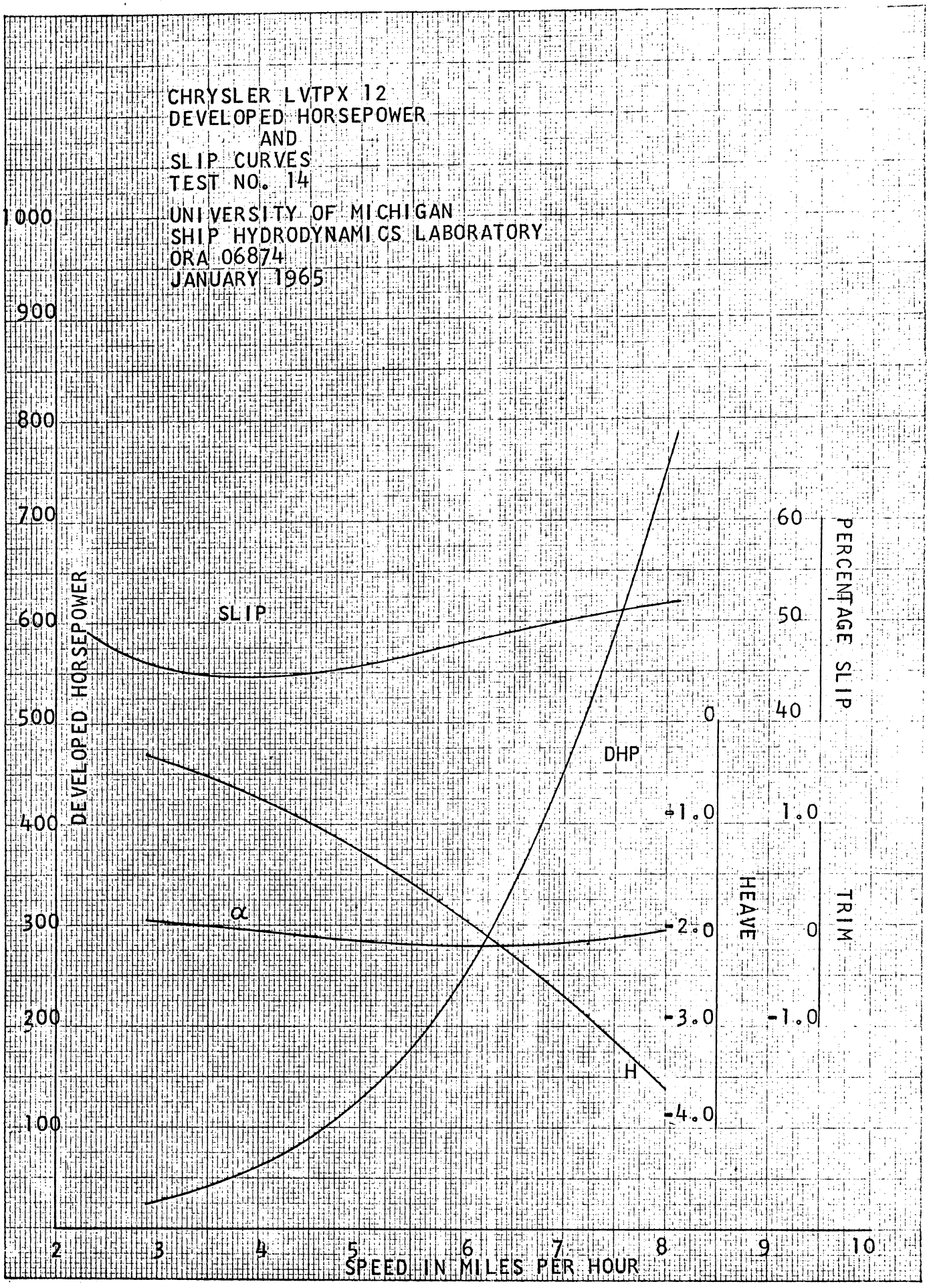

Chrysler LVTPX 12
Developed Horsepower
and
Slip Curves
Test No. 9
University of Michigan
Ship Hydrodynamics Laboratory
ORA 06874
September 1964
Developed Horsepower
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
H
α
Percentage Slip
70
60
50
40
Heave
4.0
3.0
2.0
1.0
0
Trim
2.0
1.0
0
2
3
4
5
6
7
8
9
10
Speed in Miles Per Hour

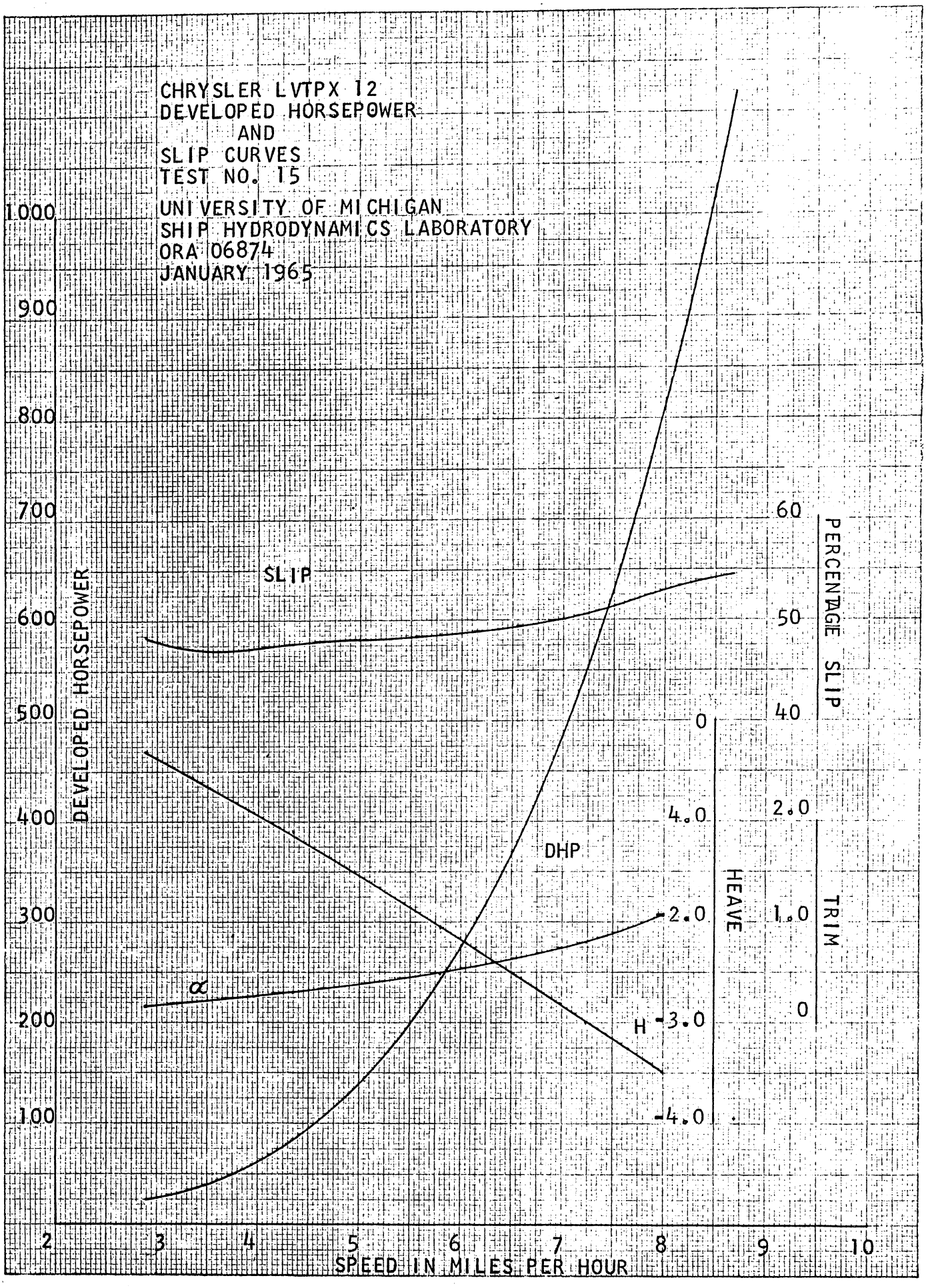

Chrysler LVTPX 12
Developed Horsepower
and
Slip Curves
Test No. 10
University of Michigan
Ship Hydrodynamics Laboratory
ORA 06874
September 1964
Developed Horsepower
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
H
α
Percentage Slip
70
60
50
40
Heave
3.0
2.0
1.0
0
-1.0
-2.0
-3.0
-4.0
Trim
1.0
0
-1.0
2
3
4
5
6
7
8
9
10
Speed in Miles Per Hour

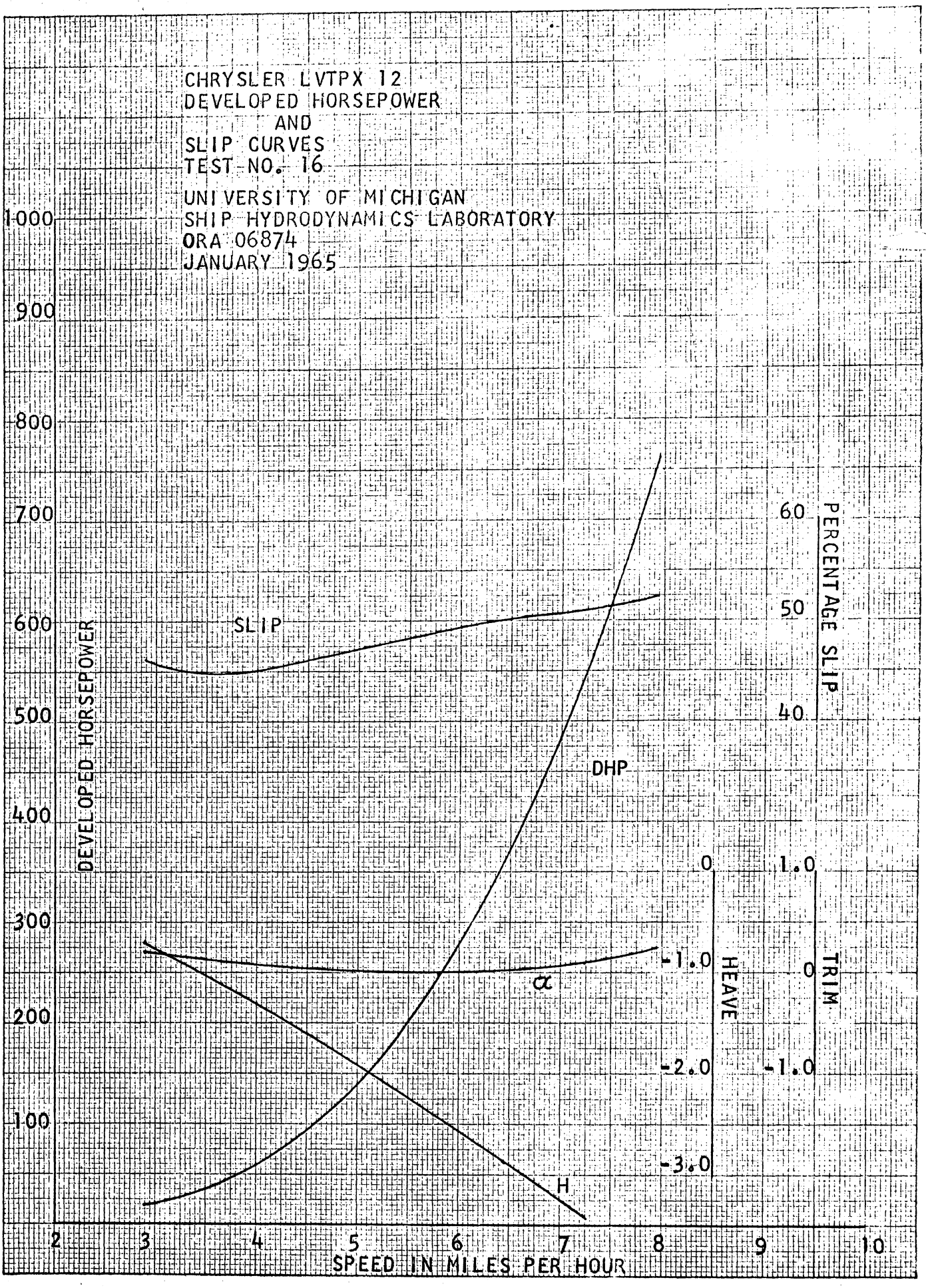

Chrysler LVTPX 12
Developed Horsepower
and
Slip Curves
Test No. 11
University of Michigan
Ship Hydrodynamics Laboratory
ORA 06874
September 1964
000
900
800
700
600
500
400
300
200
100
Developed Horsepower
SLIP
DHP
H
α
70
60
50
40
Percentage Slip
4.0
3.0
2.0
1.0
0
Heave
0
-1.0
-2.0
Trim
2
3
4
5
6
7
8
9
10
Speed in Miles Per Hour

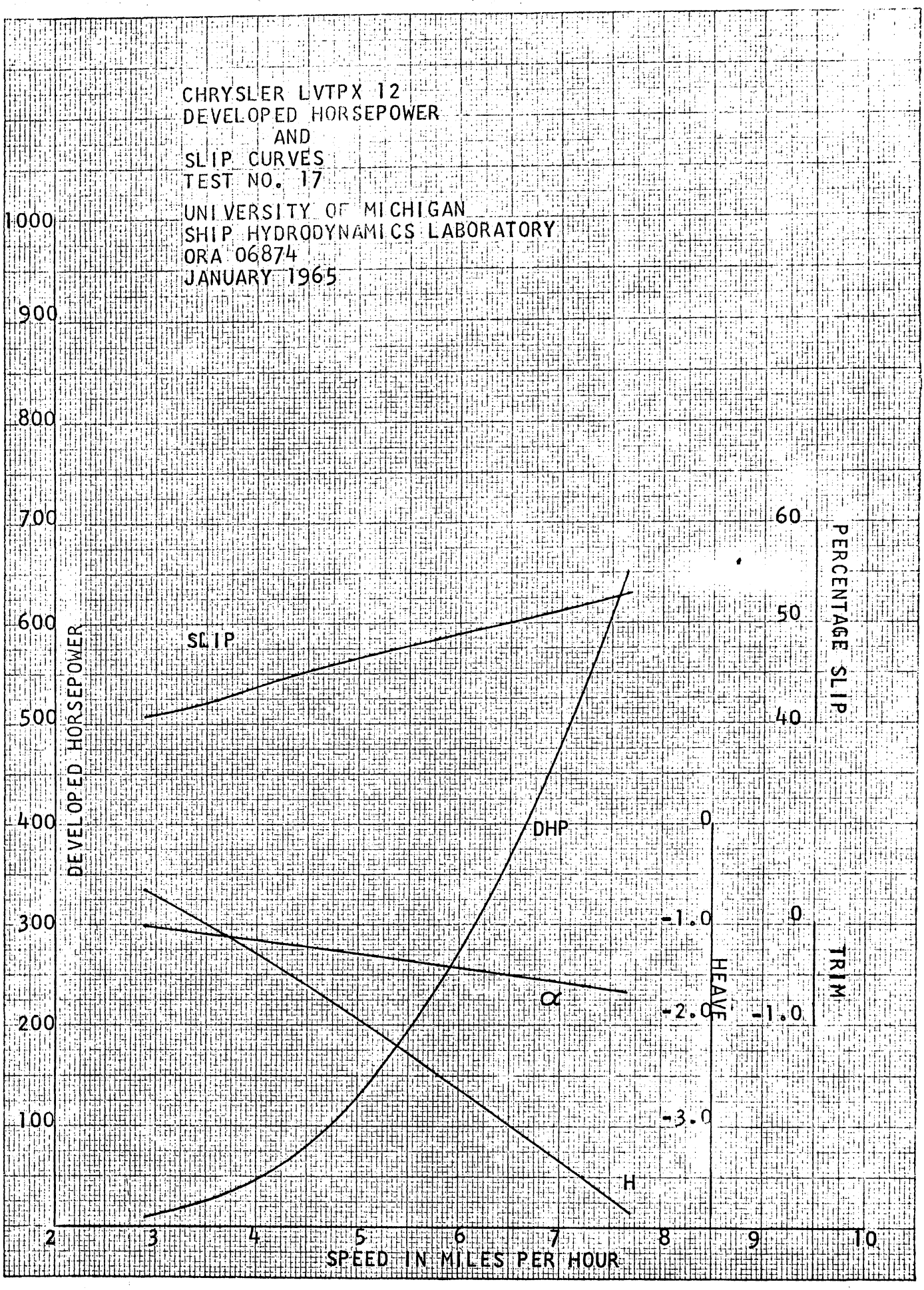

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 12
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
H
α
PERCENTAGE SLIP
60
50
40
HEAVE
4.0
3.0
2.0
1.0
0
TRIM
1.0
0
-1.0
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

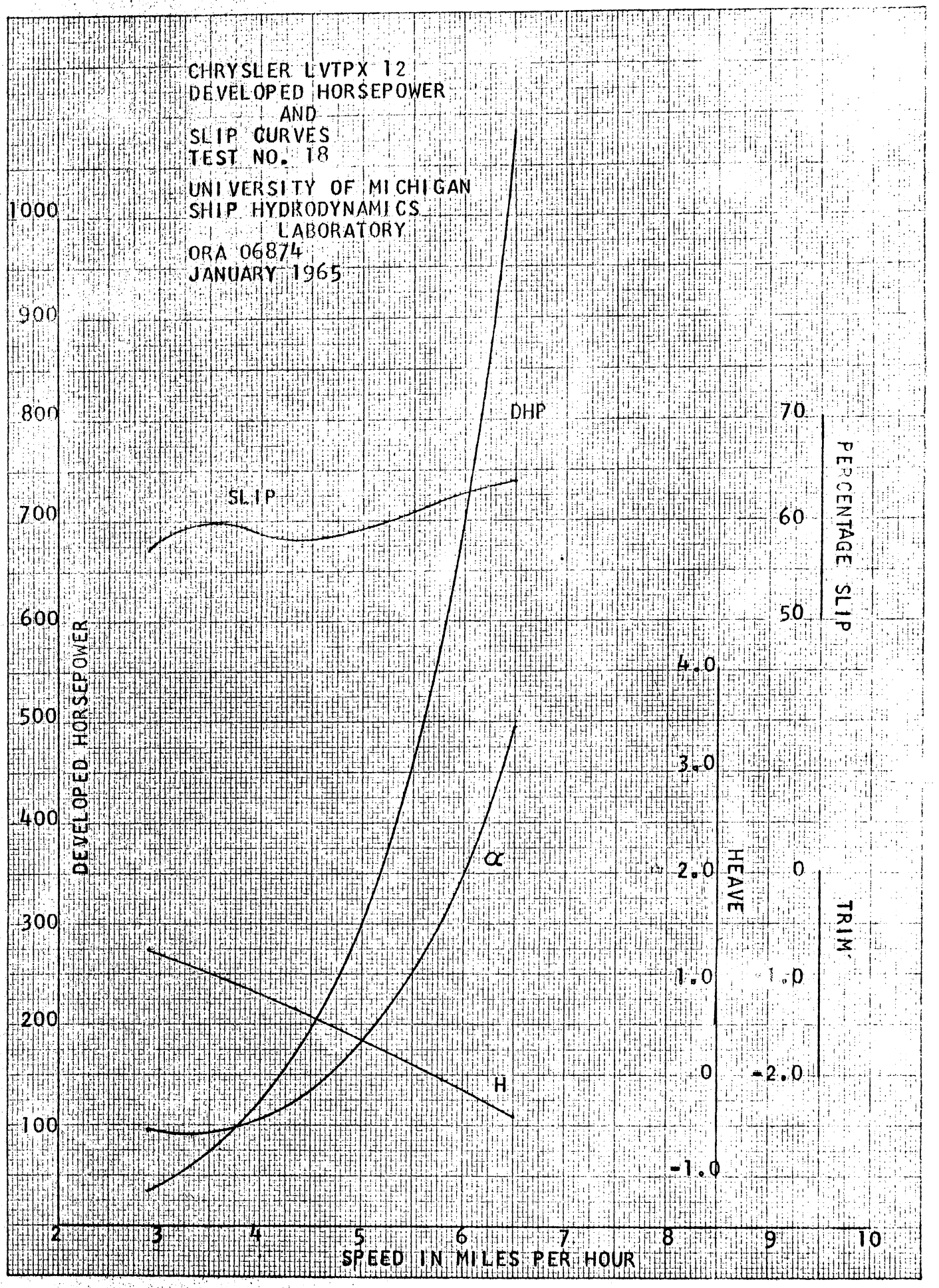

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 13
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
H
PERCENTAGE SLIP
60
50
40
HEAVE
0
-1.0
-2.0
-3.0
-4.0
TRIM
1.0
0
-1.0
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 14
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
H
PERCENTAGE SLIP
60
50
40
HEAVE
0
+1.0
-2.0
-3.0
-4.0
TRIM
1.0
0
-1.0
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 15
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
H
0
4.0
2.0
-3.0
-4.0
HEAVE
PERCENTAGE SLIP
60
50
40
2.0
1.0
0
TRIM
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 16
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
H
PERCENTAGE SLIP
60
50
40
HEAVE
0
-1.0
-2.0
-3.0
TRIM
1.0
0
-1.0
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 17
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
H
PERCENTAGE SLIP
60
50
40
0
-1.0
-2.0
-3.0
HEAVE
TRIM
0
-1.0
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 18
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS
LABORATORY
ORA 06874
JANUARY 1965
DHP
SLIP
α
H
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
PERCENTAGE SLIP
70
60
50
HEAVE
4.0
3.0
2.0
1.0
0
-1.0
TRIM
0
-2.0
2
3
4
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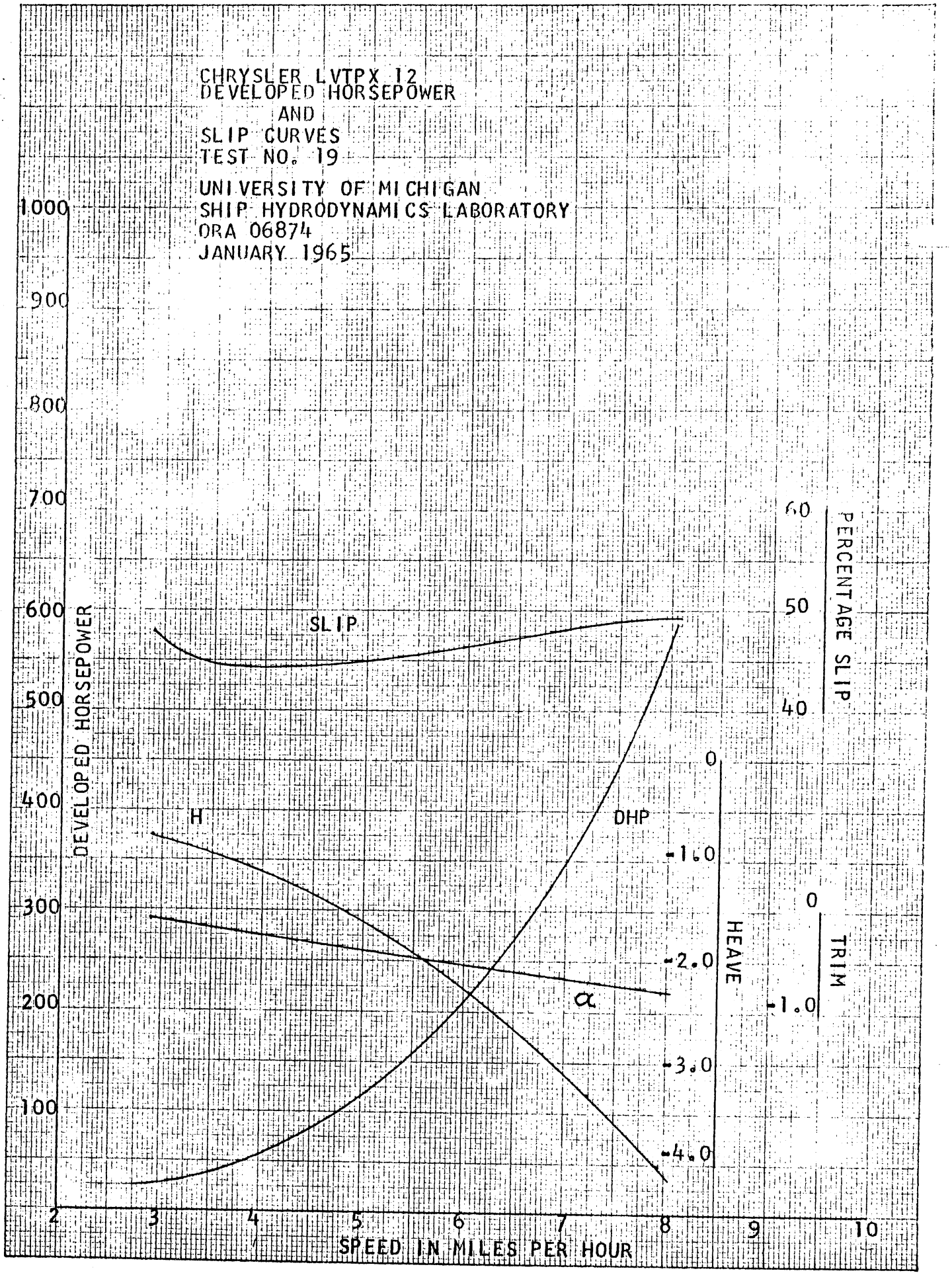
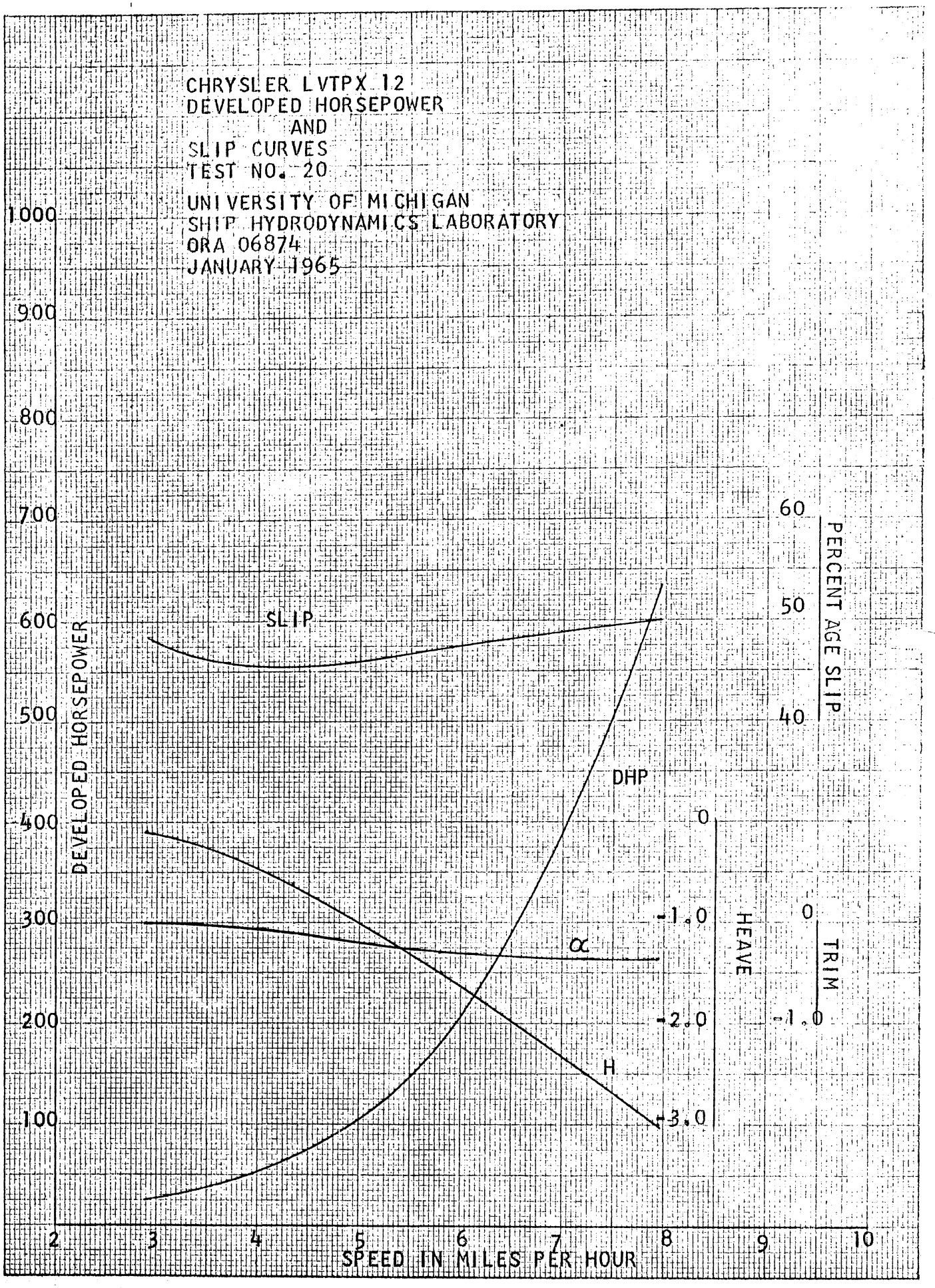
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 19
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
H
DHP
α
PERCENTAGE SLIP
60
50
40
HEAVE
0
-1.0
-2.0
-3.0
-4.0
TRIM
0
-1.0
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 20
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
α
H
PERCENT AGE SLIP
60
50
40
HEAVE
0
-1.0
-2.0
-3.0
TRIM
0
-1.0
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3
4
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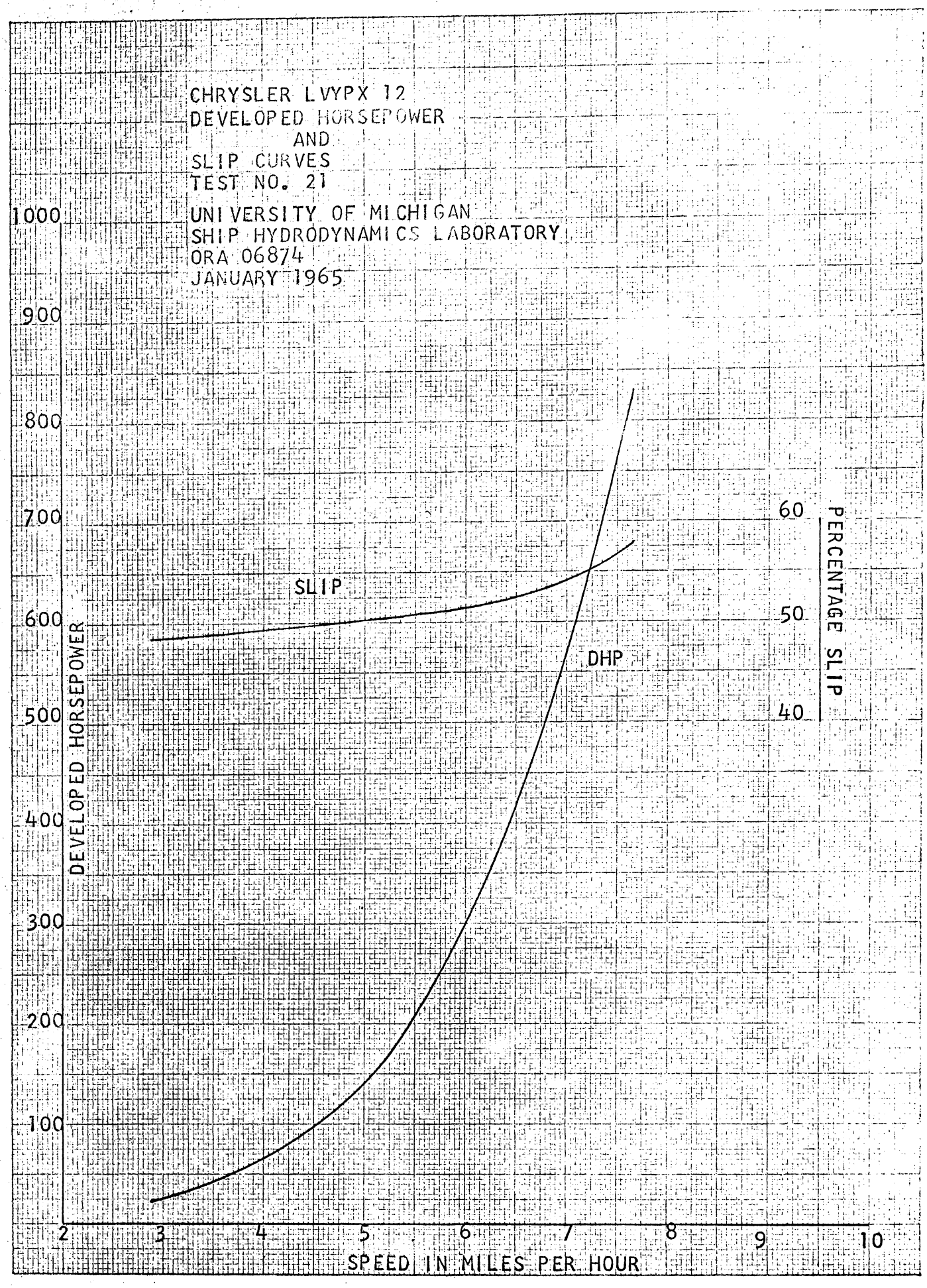
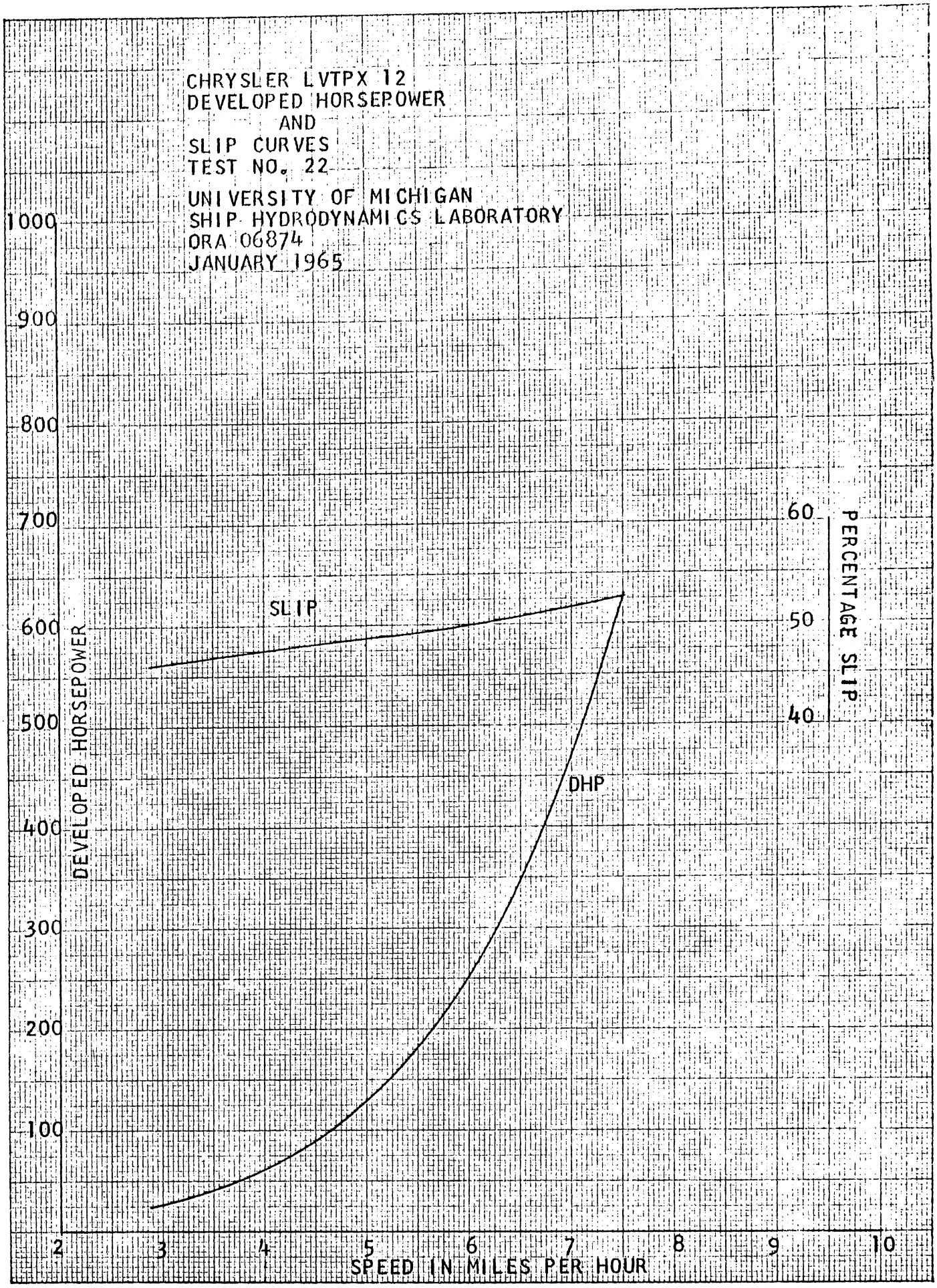
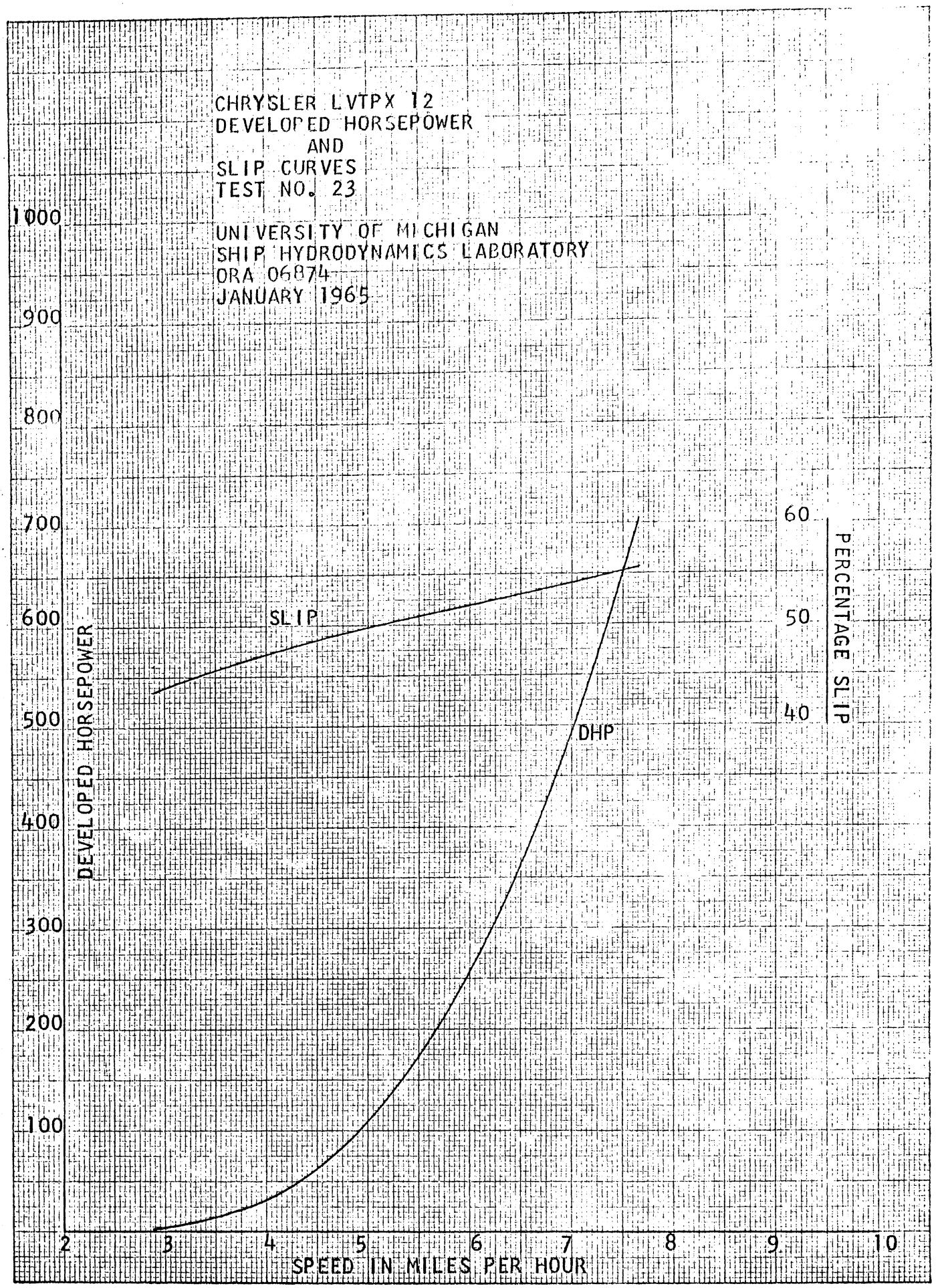
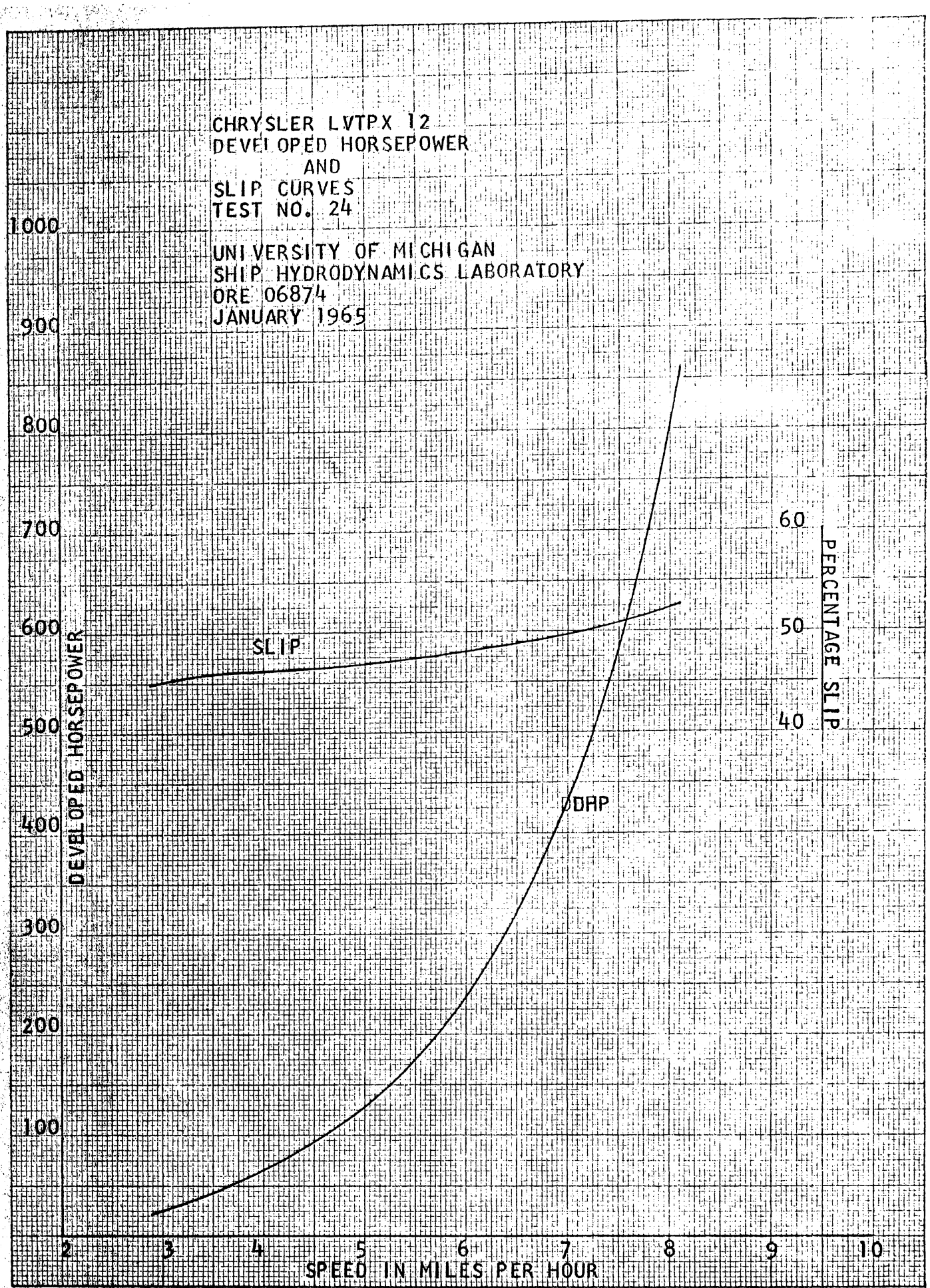
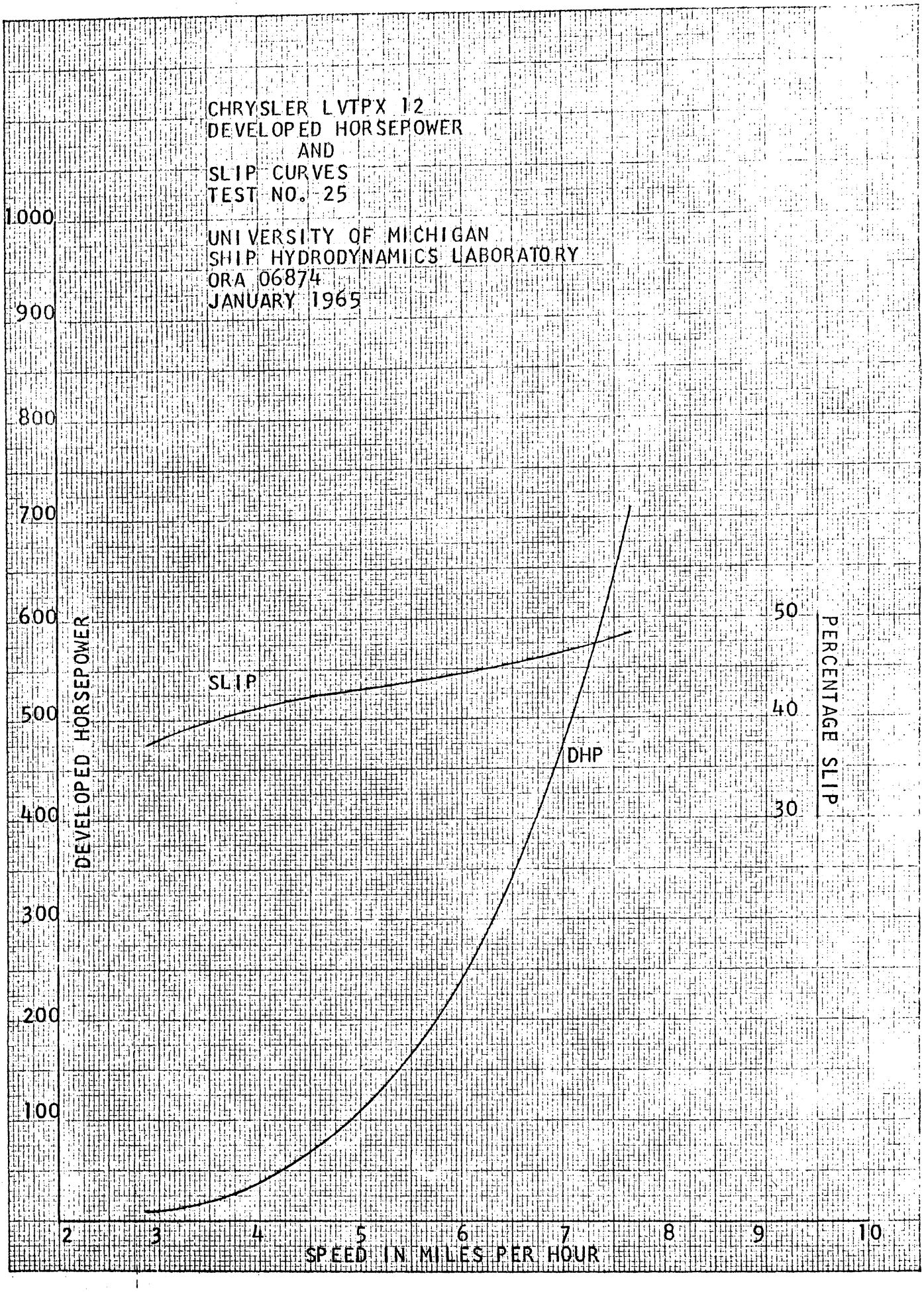
6
7
8
9
10
SPEED IN MILES PER HOUR

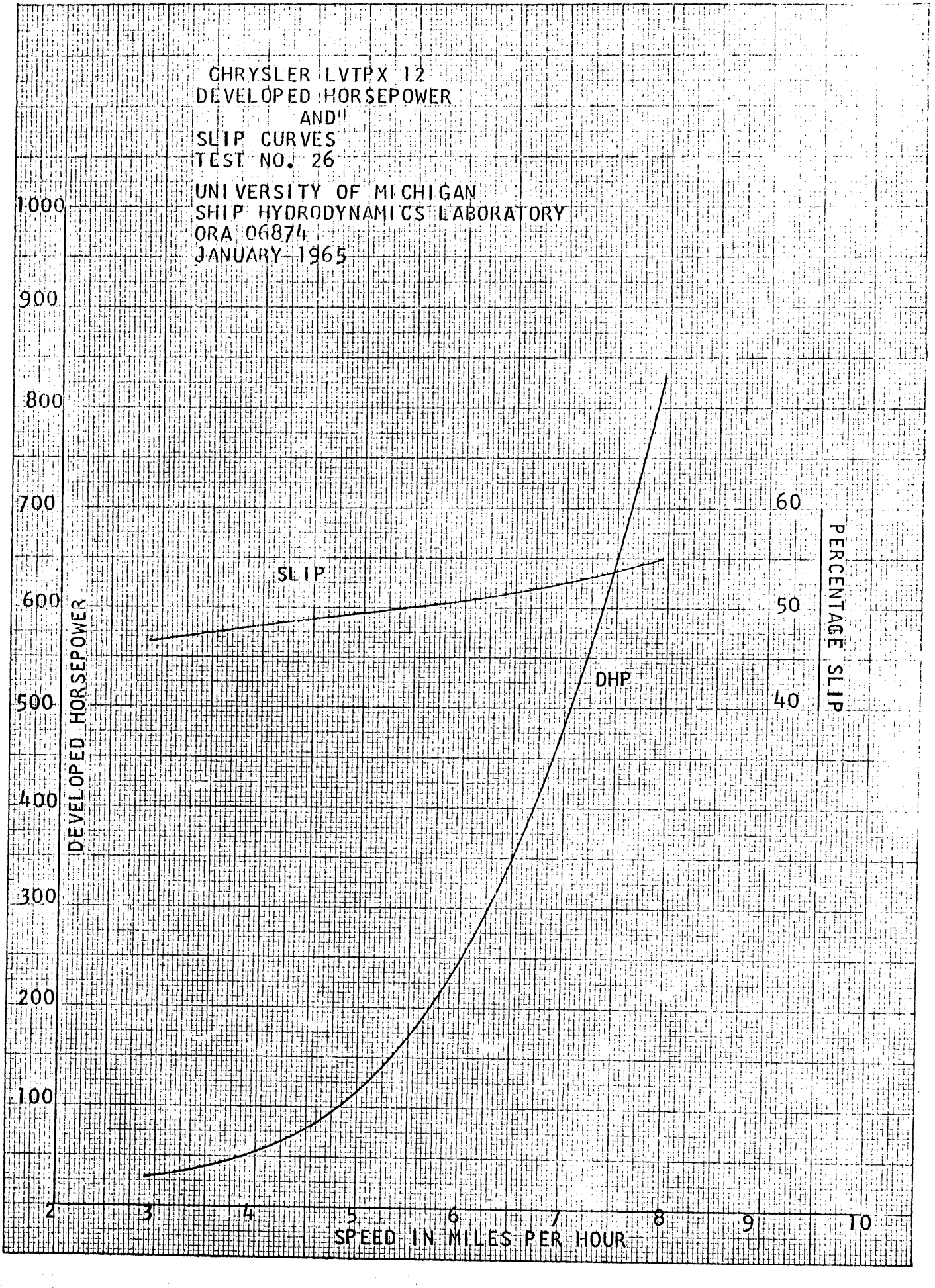

CHRYSLER LVYPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 21
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
1000
900
800
700
600
500
400
300
200
100
DEVELOPED HORSEPOWER
SLIP
DHP
60
50
40
PERCENTAGE SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

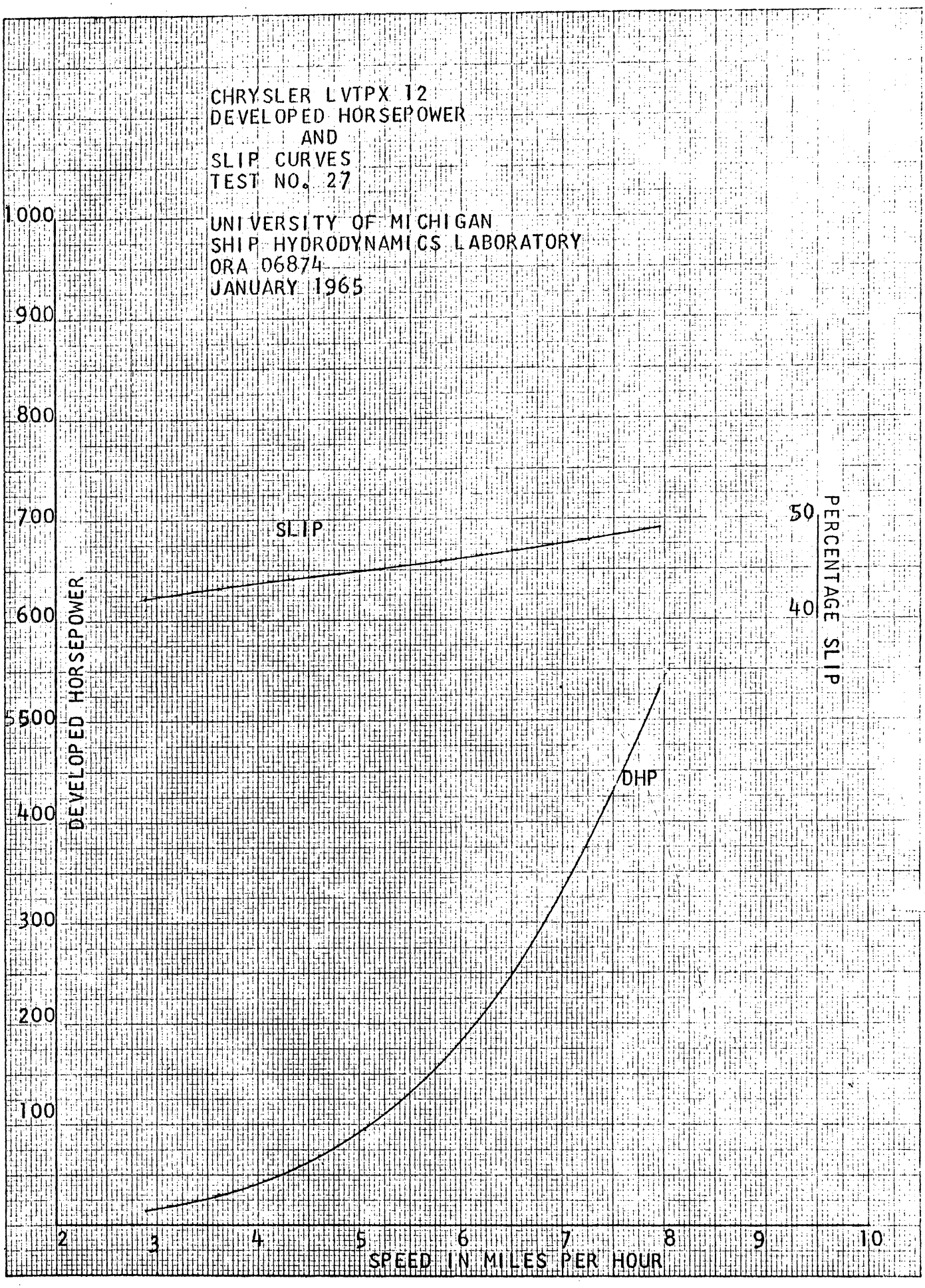

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 22
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
PERCENTAGE SLIP
60
50
40
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

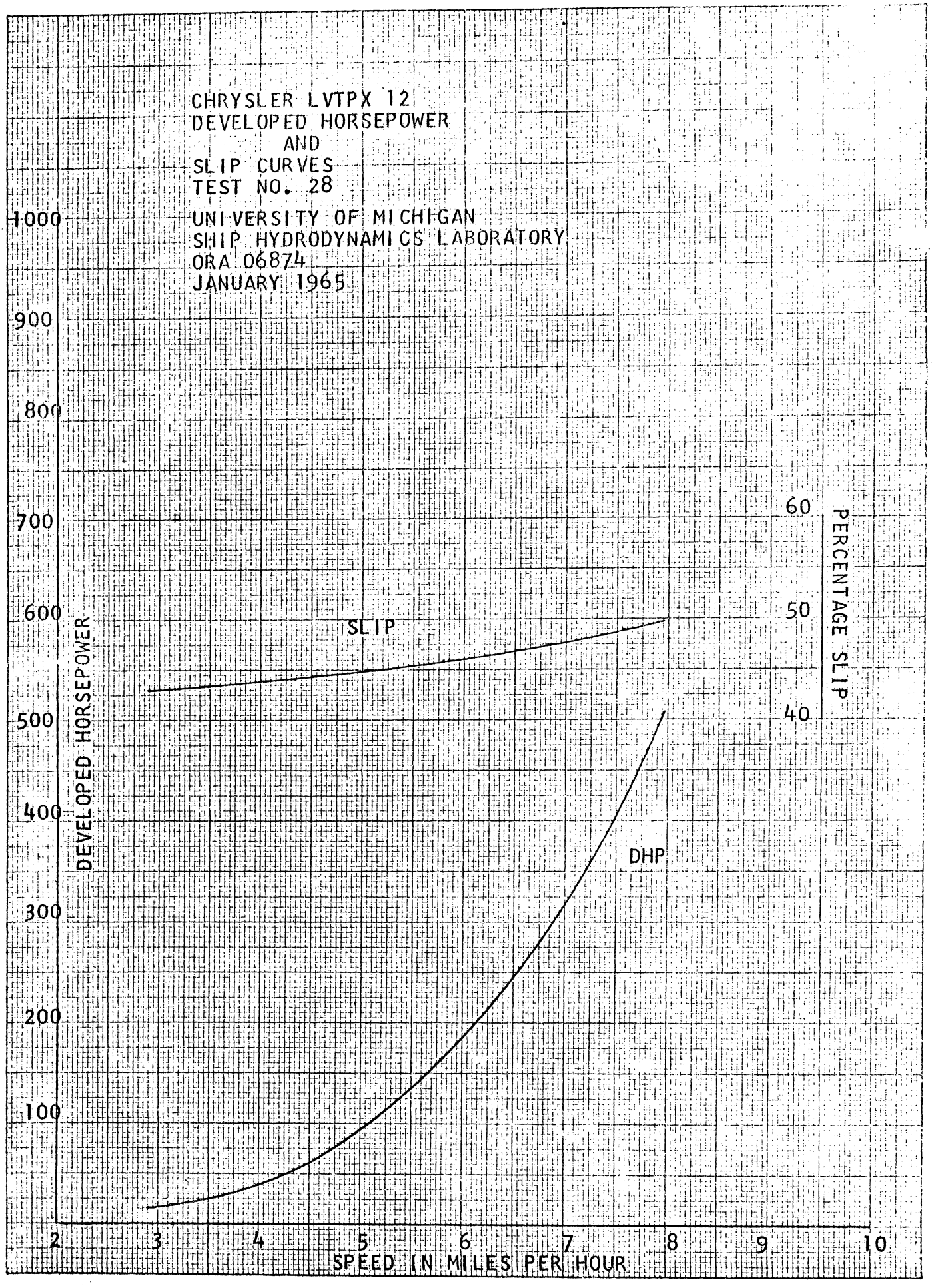

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 23
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
PERCENTAGE SLIP
60
50
40
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

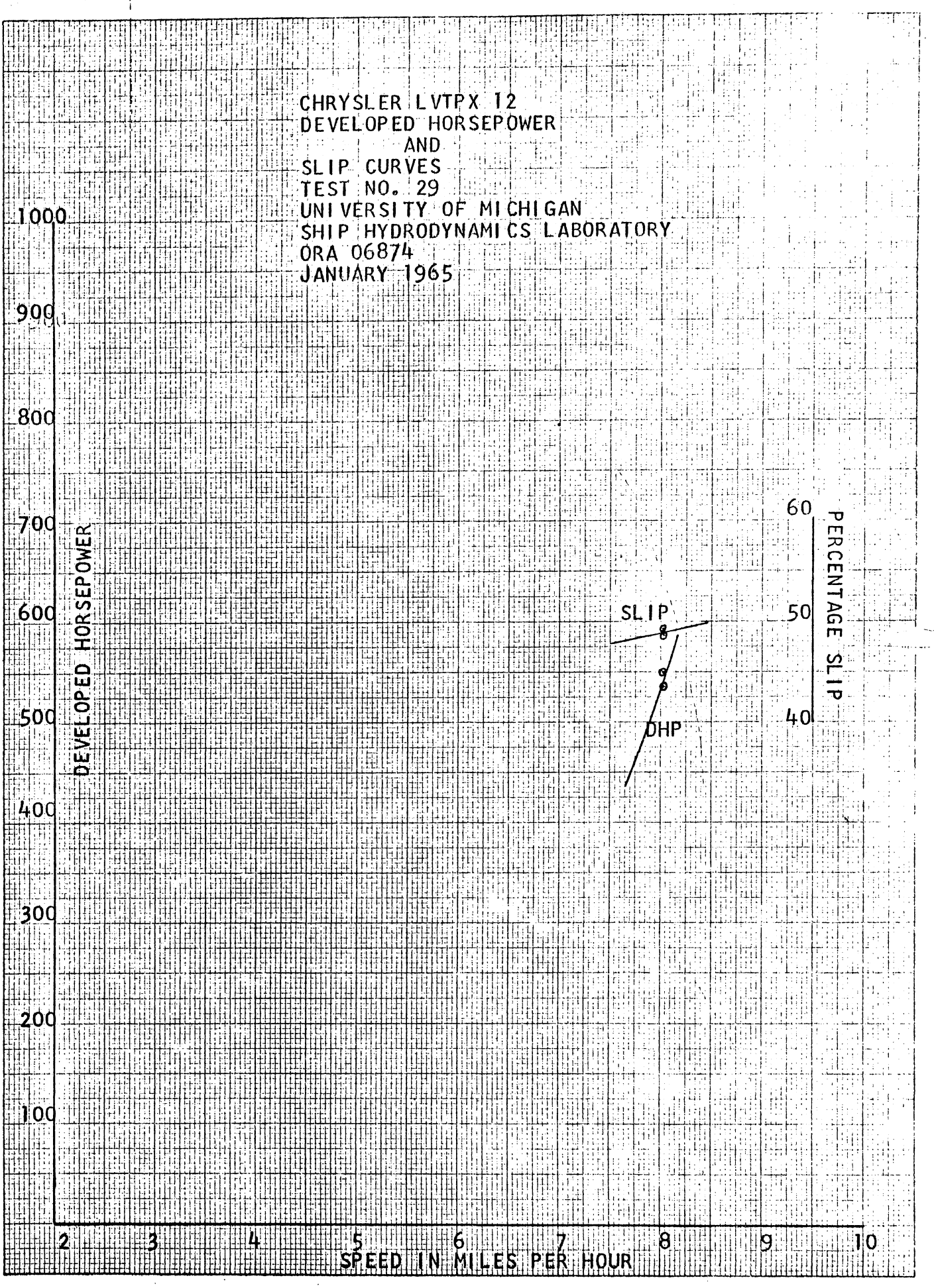

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 24
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORE 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DRP
PERCENTAGE SLIP
60
50
40
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

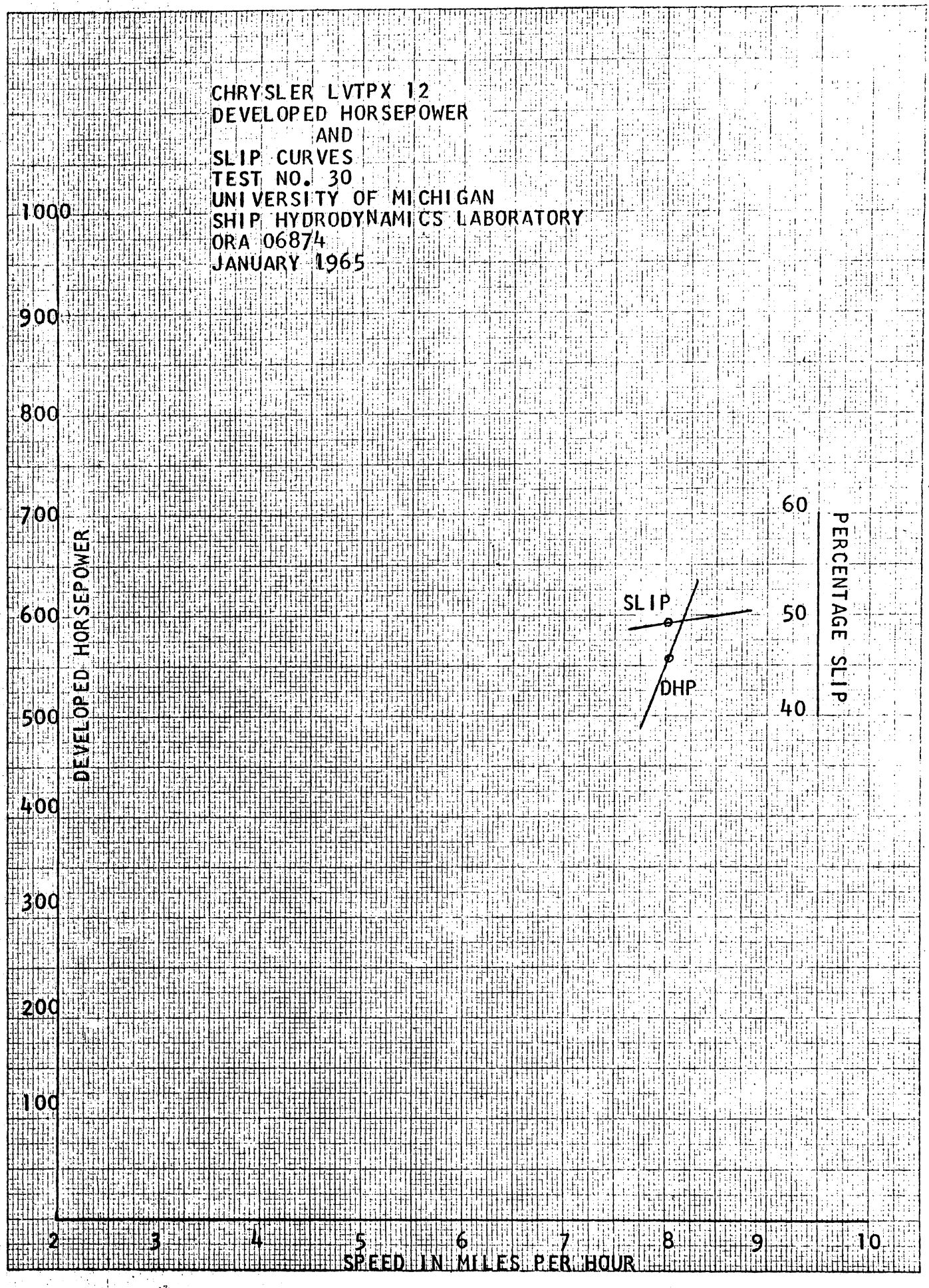

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 25
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
PERCENTAGE SLIP
50
40
30
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

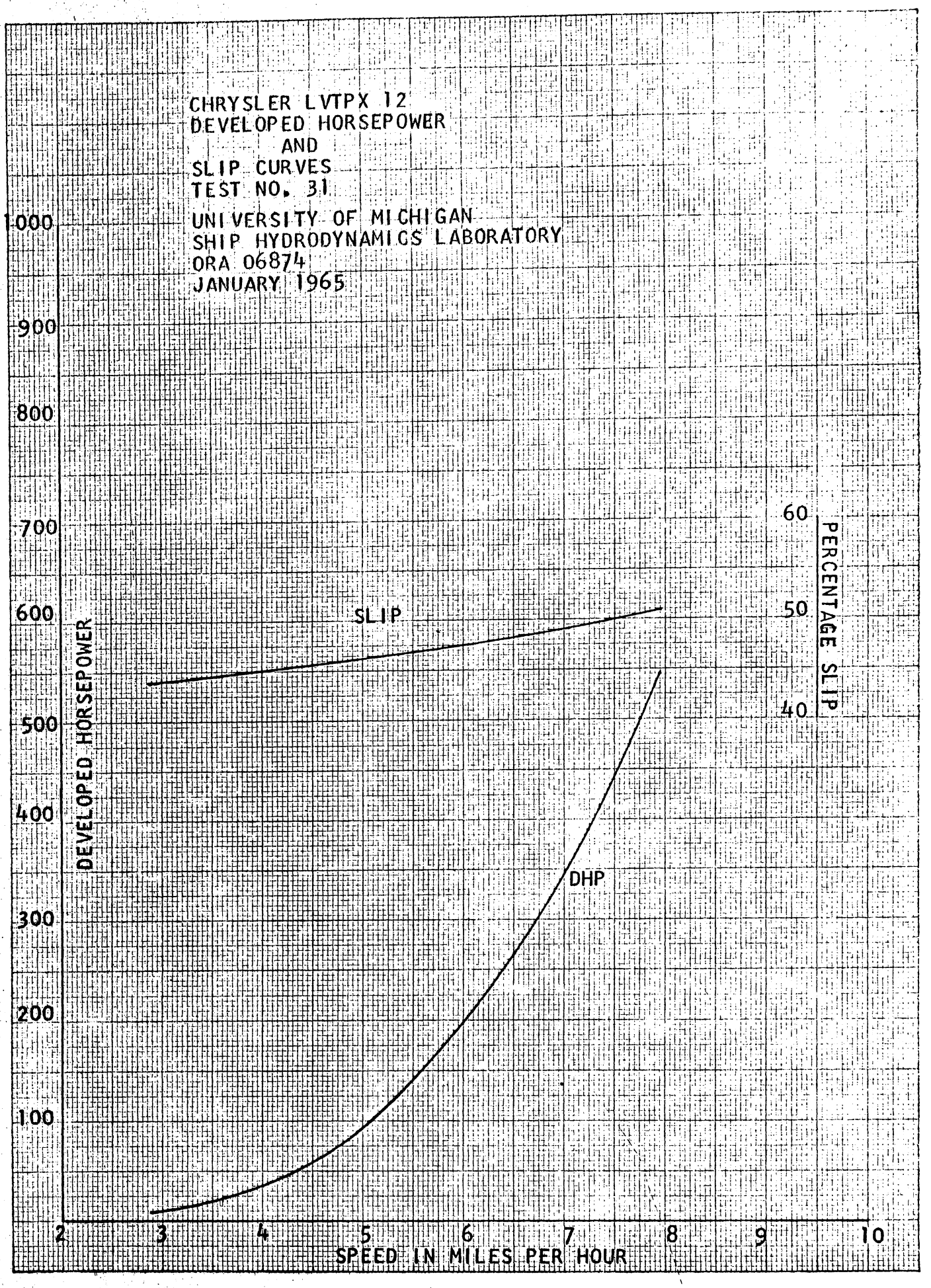

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 26
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
PERCENTAGE SLIP
60
50
40
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

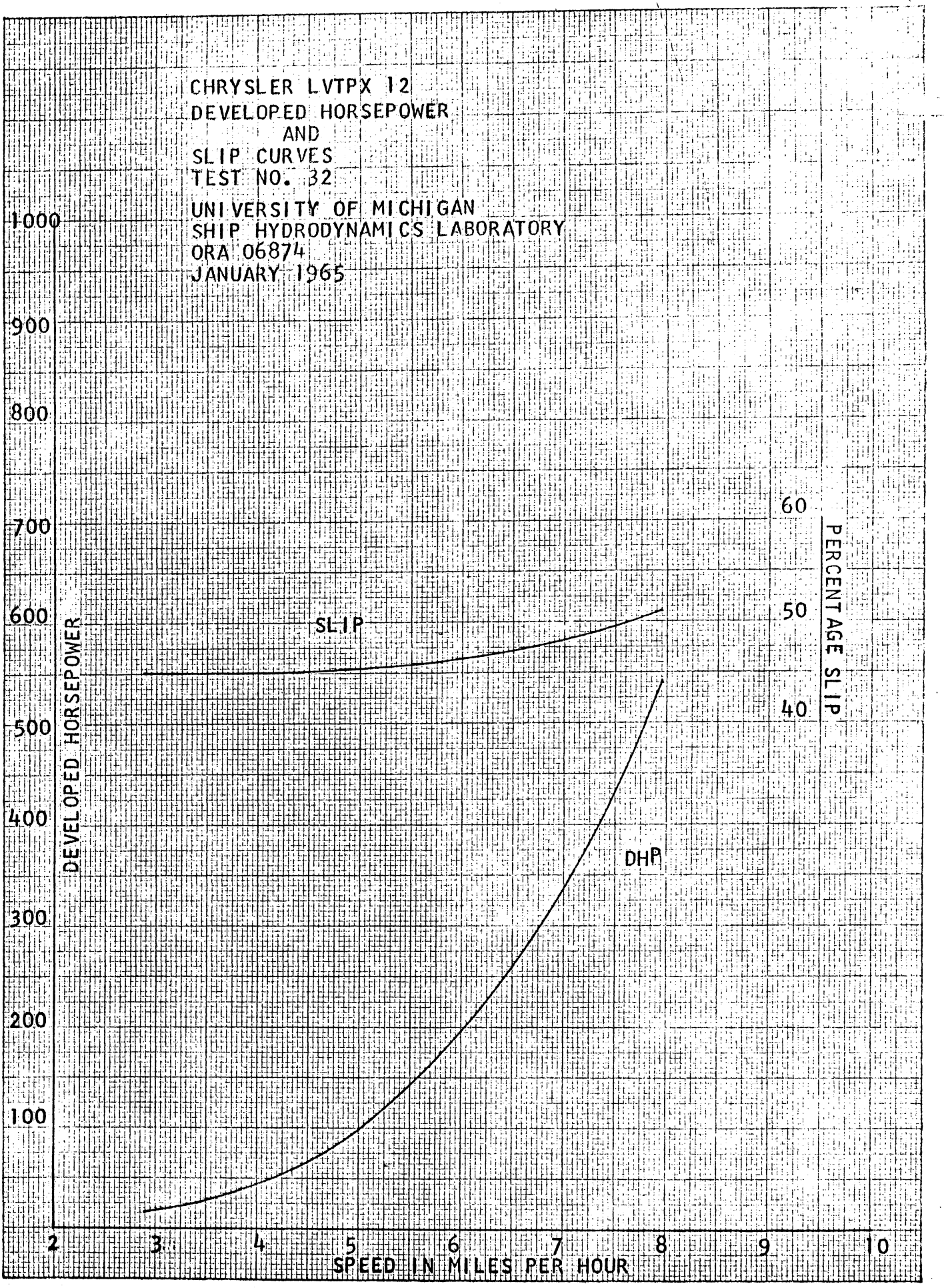

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 27
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
SLIP
DHP
DEVELOPED HORSEPOWER
PERCENTAGE SLIP
SPEED IN MILES PER HOUR
1000
900
800
700
600
500
400
300
200
100
50
40
2
3
4
5
6
7
8
9
10

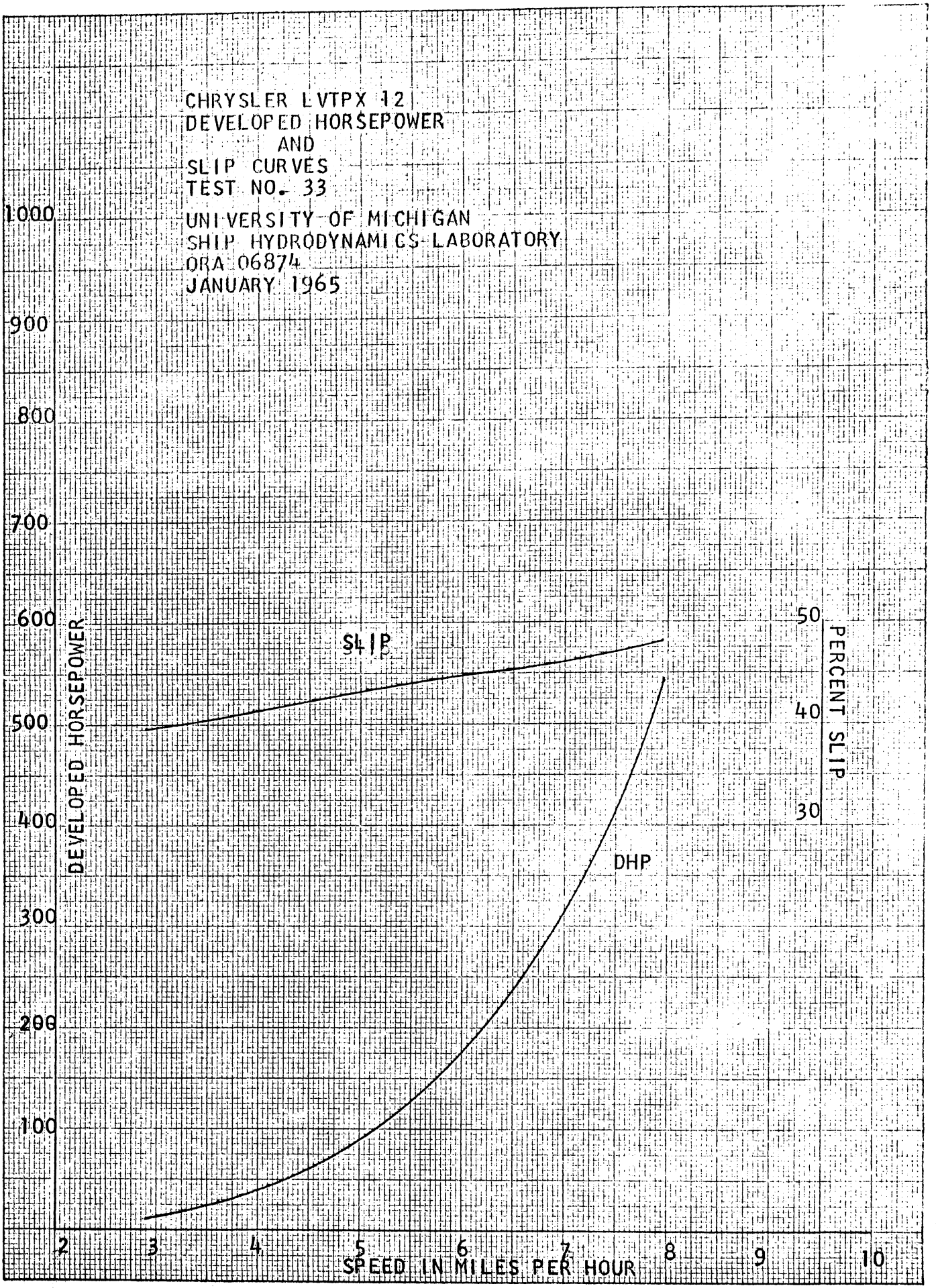

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 28
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
PERCENTAGE SLIP
60
50
40
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

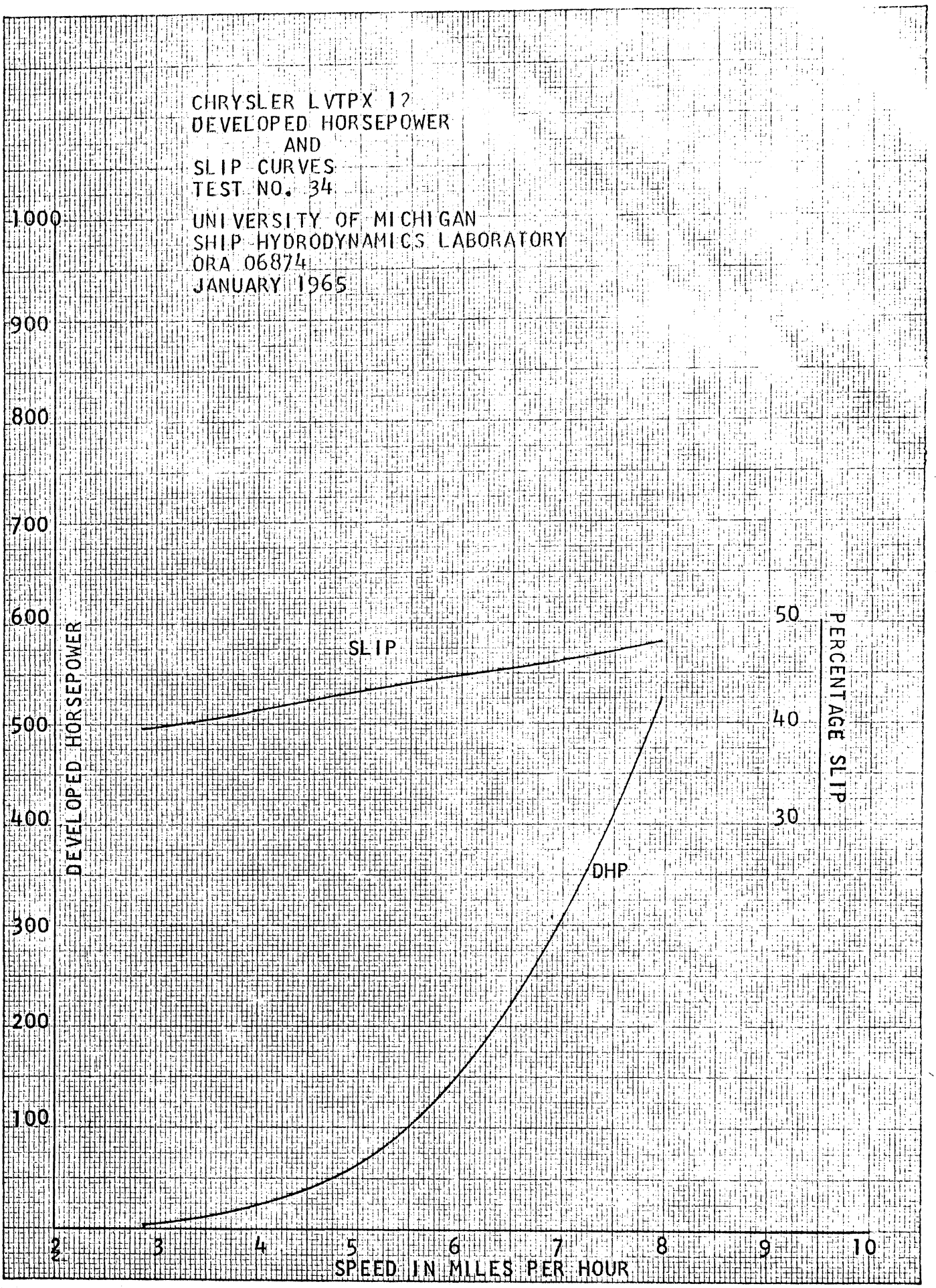

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 29
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
PERCENTAGE SLIP
60
50
40
SLIP
DHP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

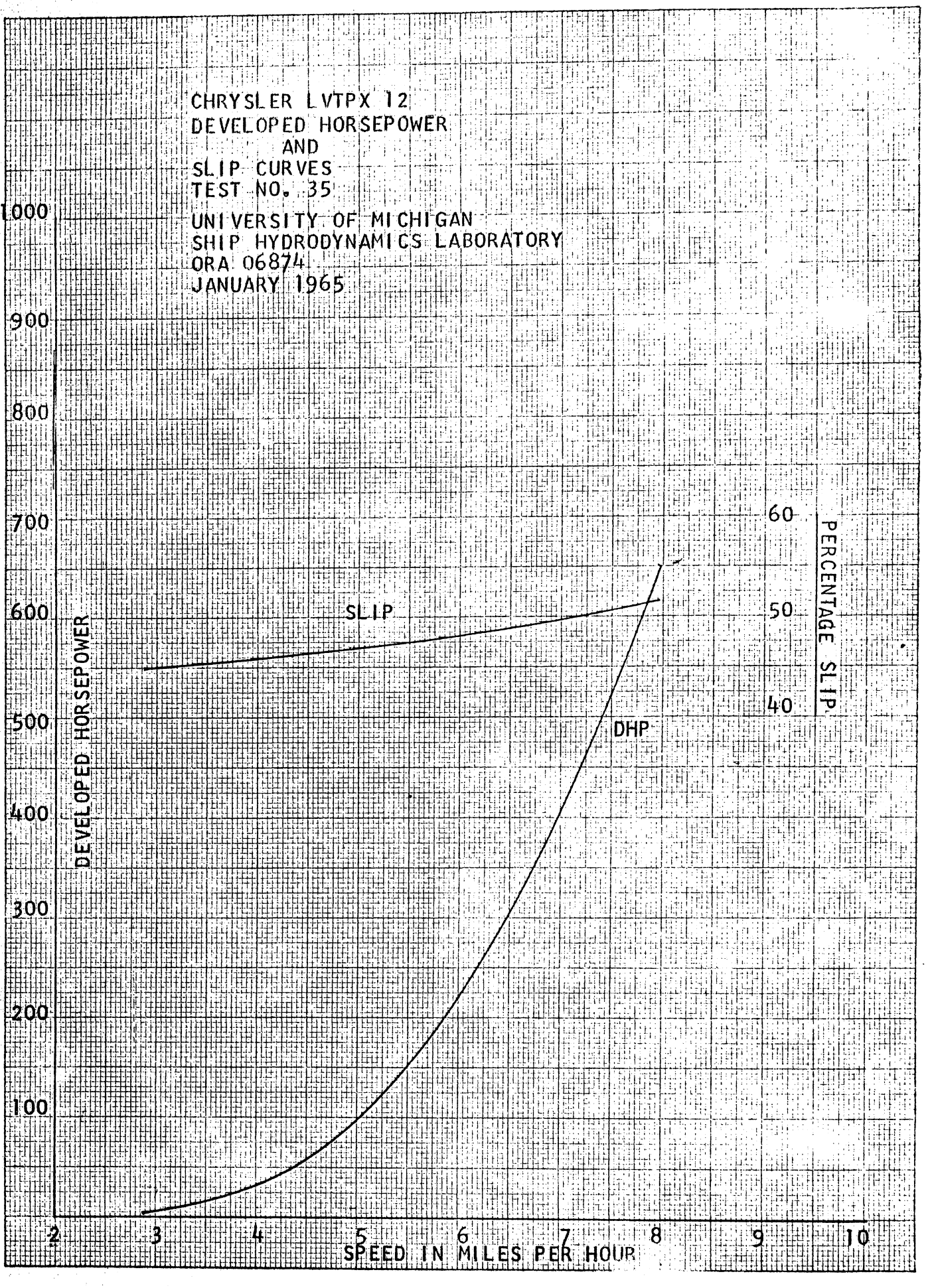

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 30
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
60
50
40
PERCENTAGE SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

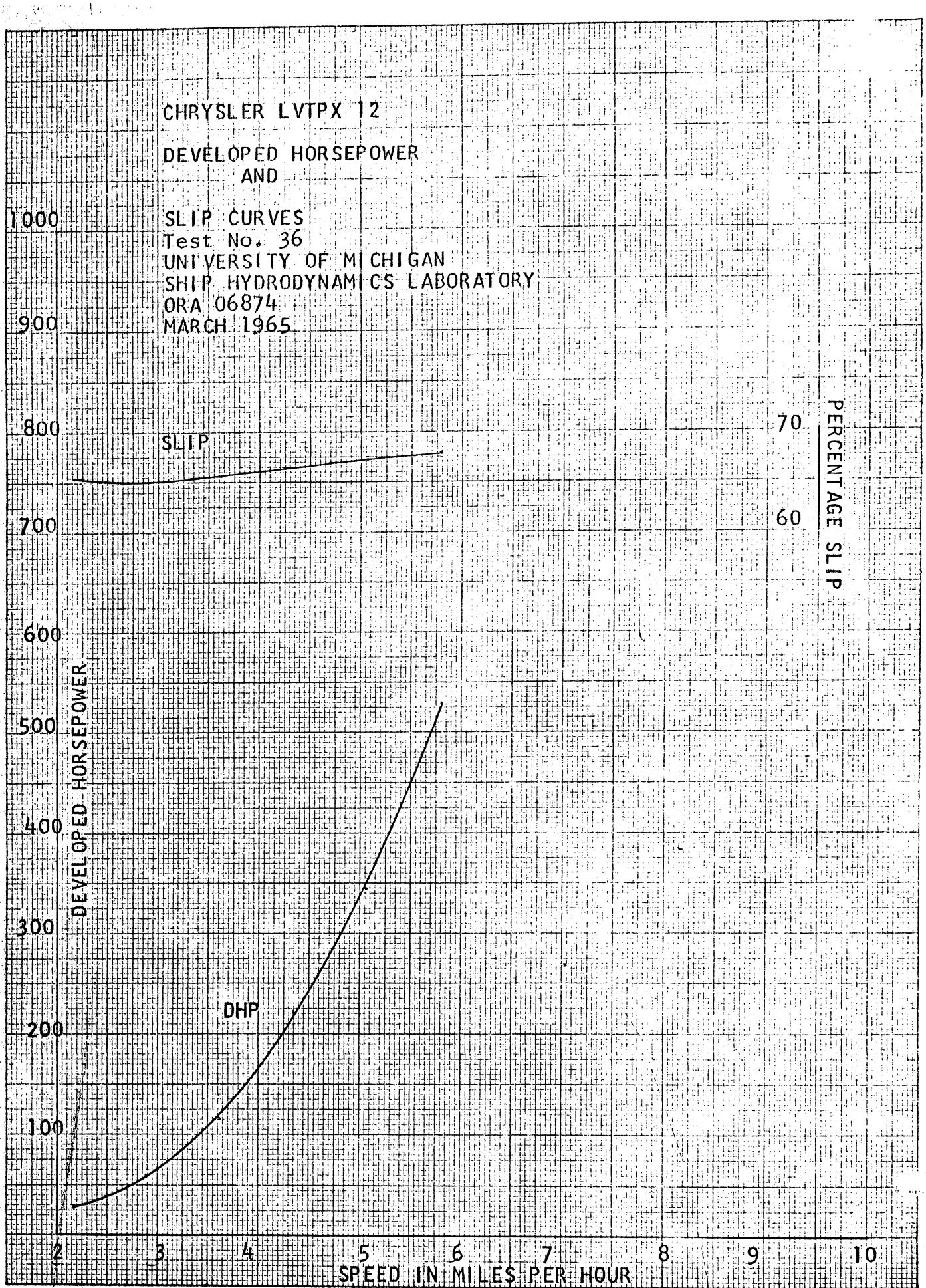

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 31
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
PERCENTAGE SLIP
60
50
40
SLIP
DHP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 32
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
PERCENTAGE SLIP
60
50
40
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 33
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
30
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 34
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
PERCENTAGE SLIP
50
40
30
2½
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 35
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
PERCENTAGE SLIP
60
50
40
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 36
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
SLIP
DHP
DEVELOPED HORSEPOWER
PERCENTAGE SLIP
SPEED IN MILES PER HOUR
1000
900
800
700
600
500
400
300
200
100
70
60
2
3
4
5
6
7
8
9
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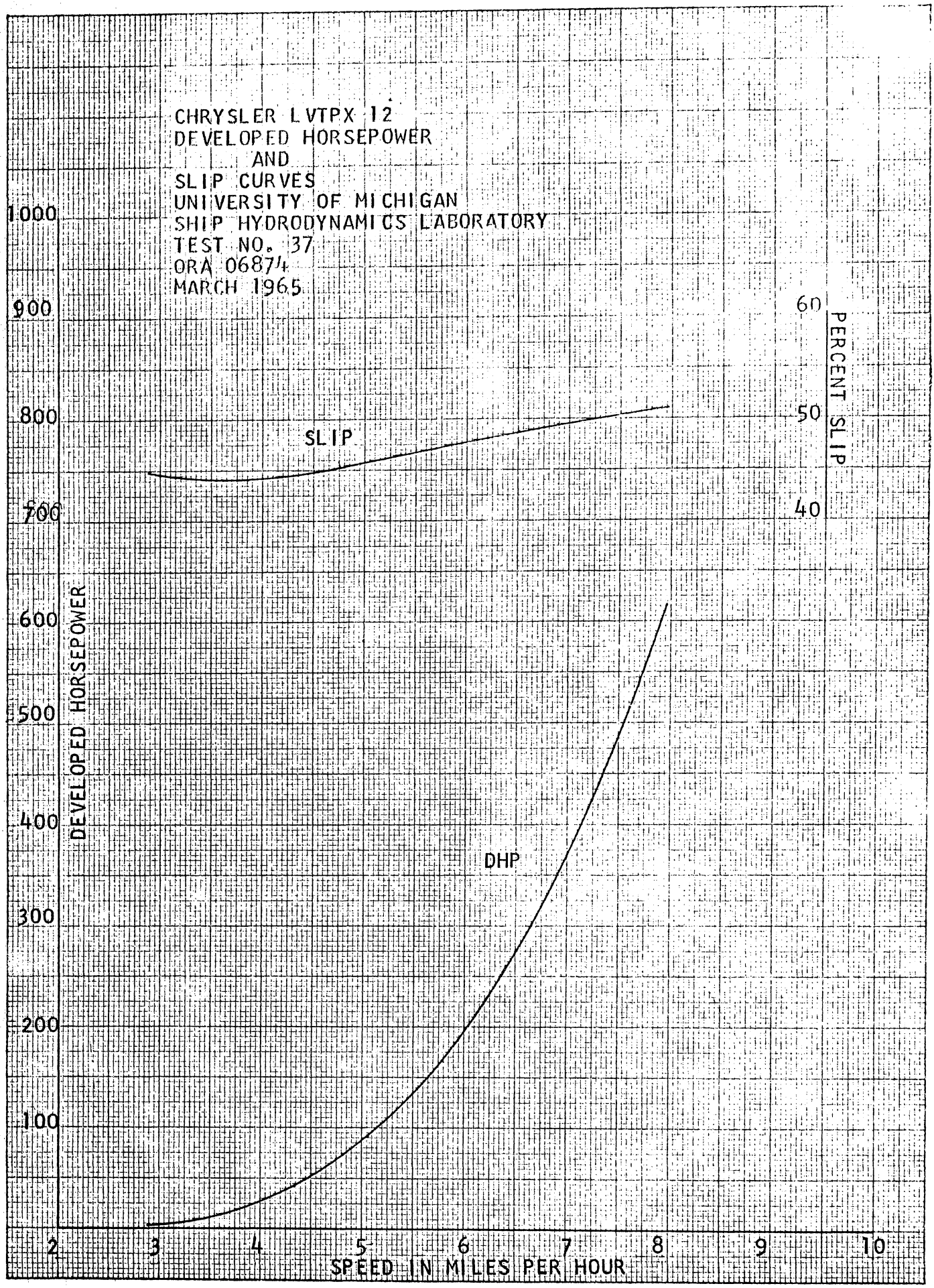
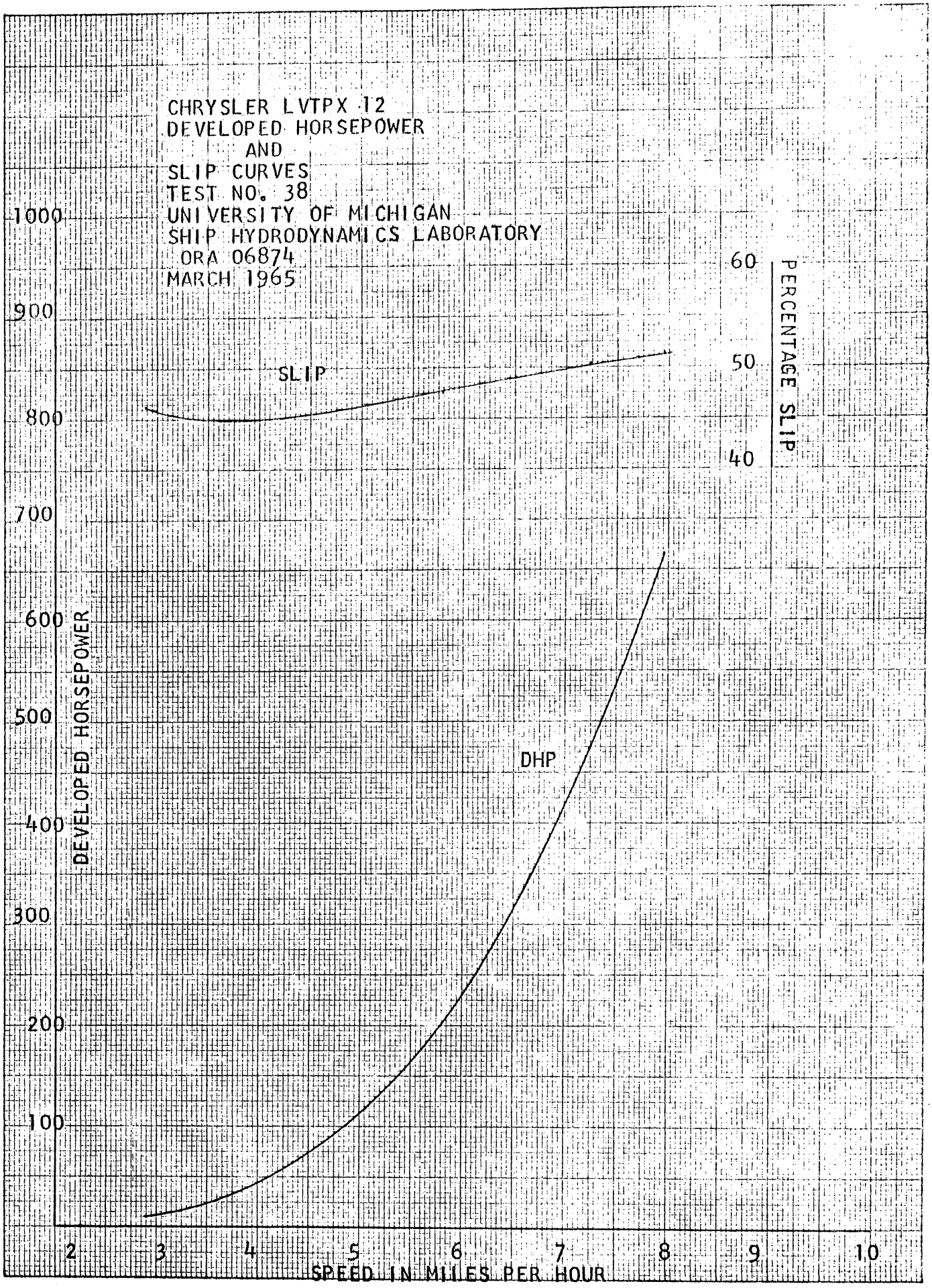

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
TEST NO. 37
ORA 06874
MARCH 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
PERCENT SLIP
60
50
40
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 38
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
SLIP
DHP
DEVELOPED HORSEPOWER
PERCENTAGE SLIP
SPEED IN MILES PER HOUR
1000
900
800
700
600
500
400
300
200
100
60
50
40
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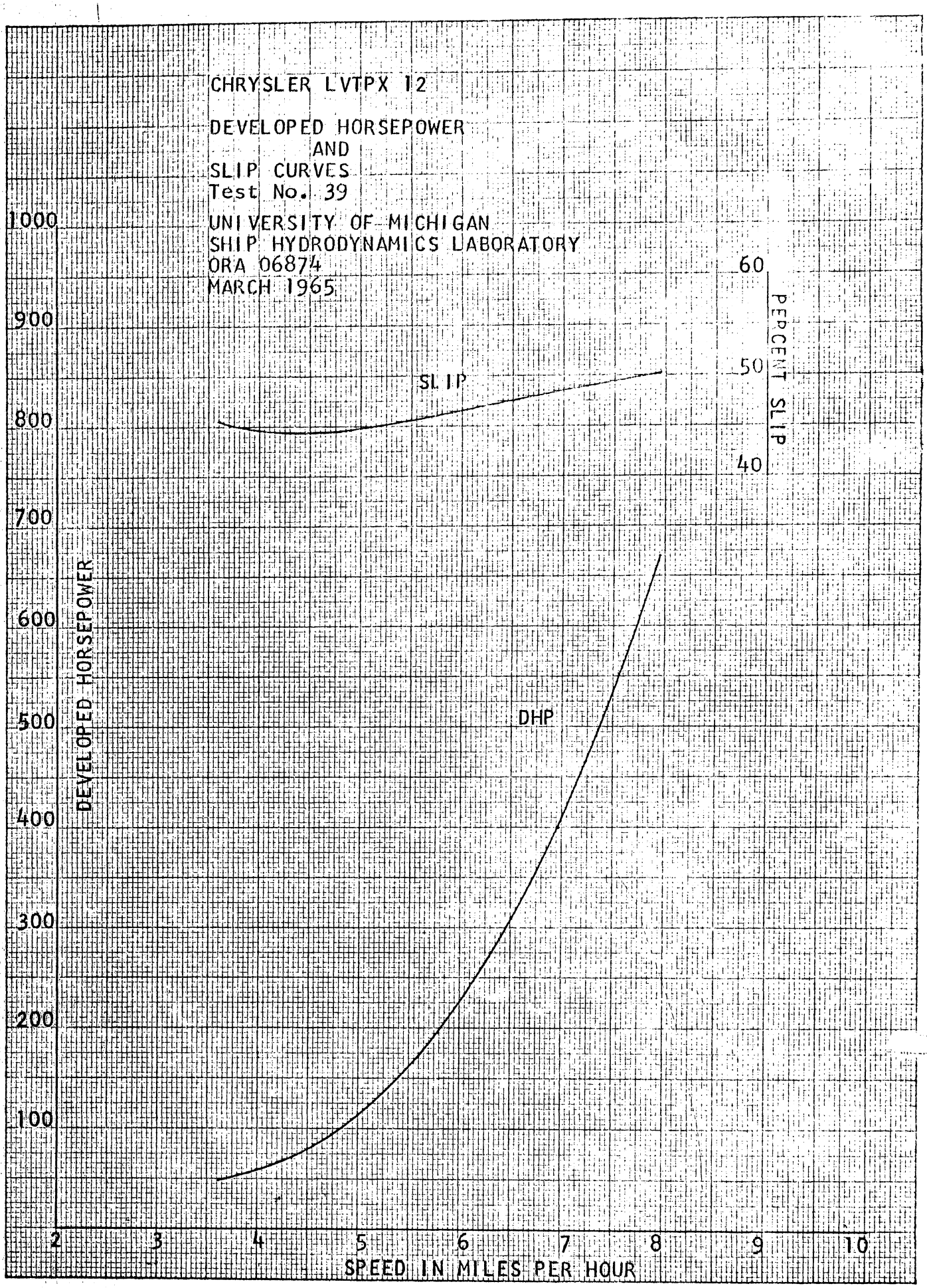
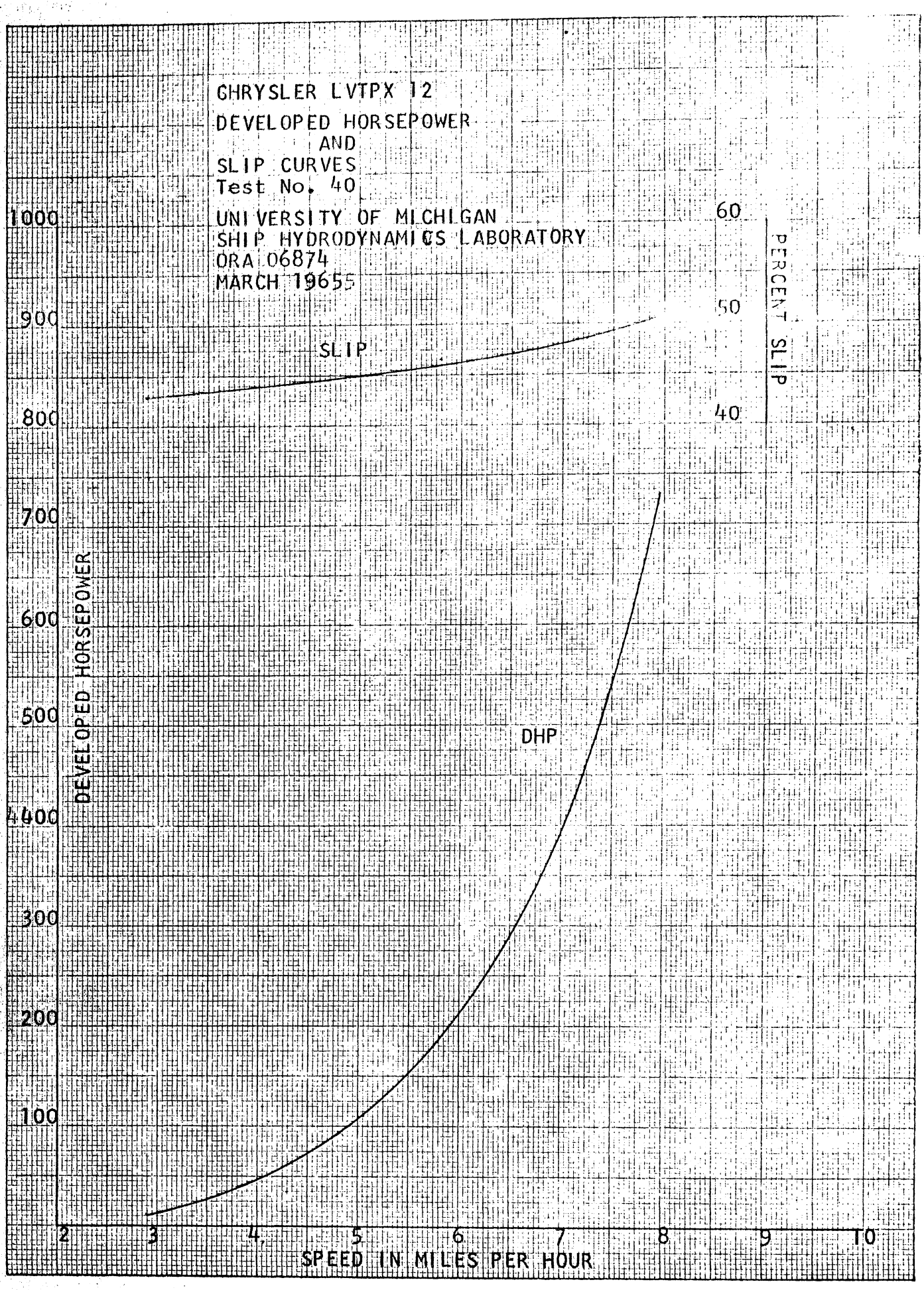

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 39
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
SLIP
DHP
DEVELOPED HORSEPOWER
PERCENT SLIP
SPEED IN MILES PER HOUR
1000
900
800
700
600
500
400
300
200
100
60
50
40
2
3
4
5
6
7
8
9
10


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 40
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 19655
SLIP
DHP
DEVELOPED HORSEPOWER
PERCENT SLIP
SPEED IN MILES PER HOUR
1000
900
800
700
600
500
400
300
200
100
60
50
40
2
3
4
5
6
7
8
9
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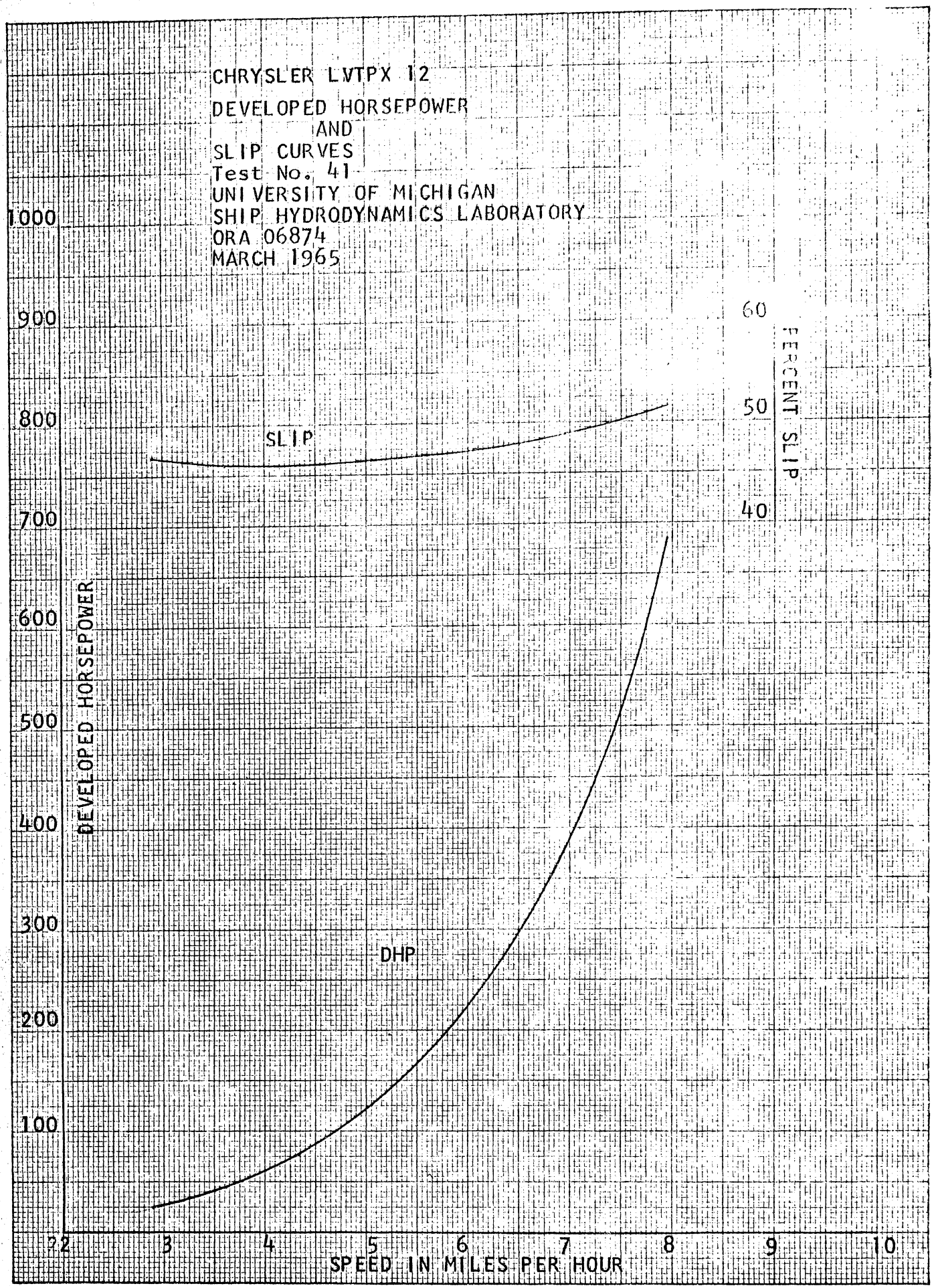
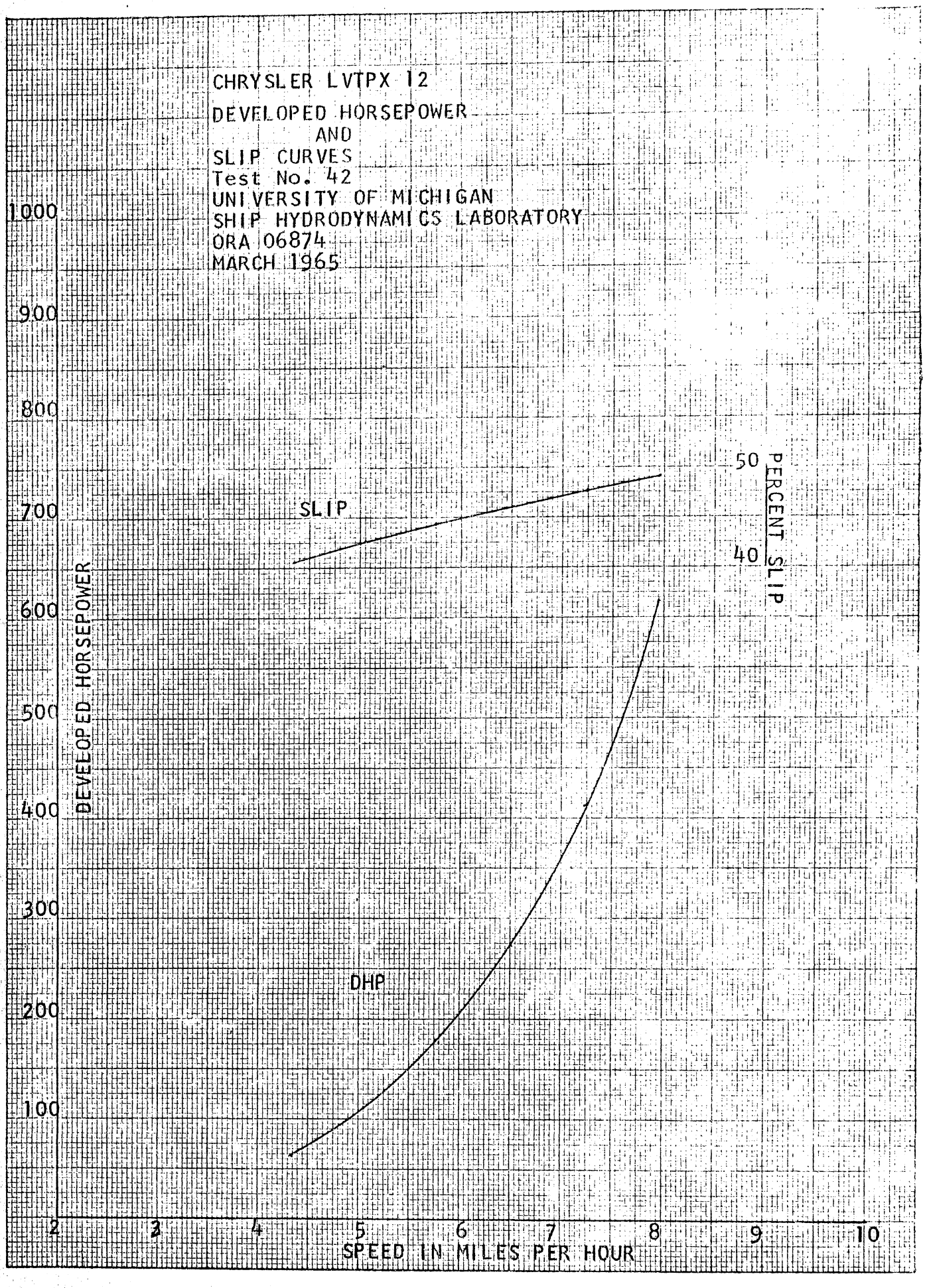
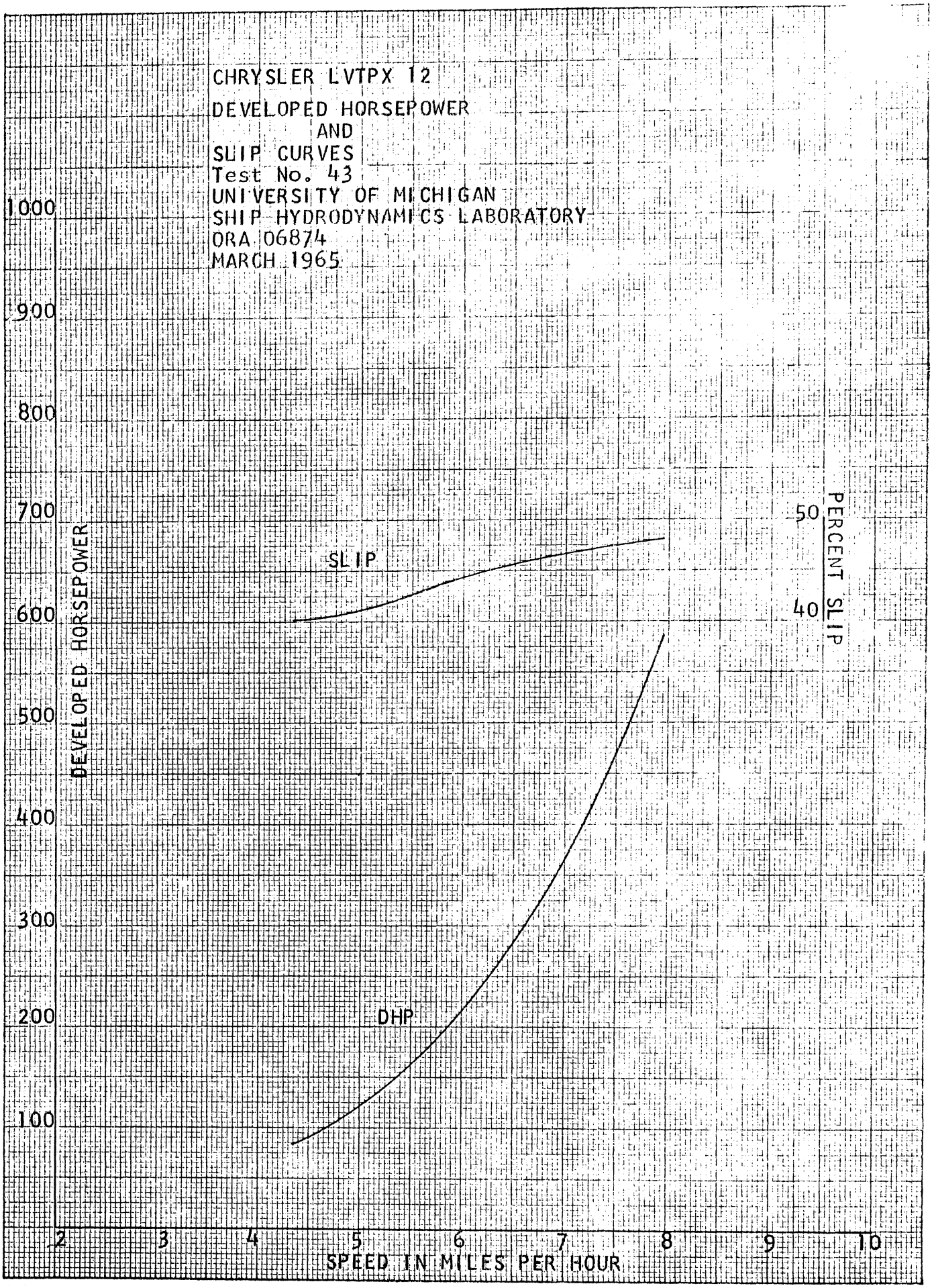
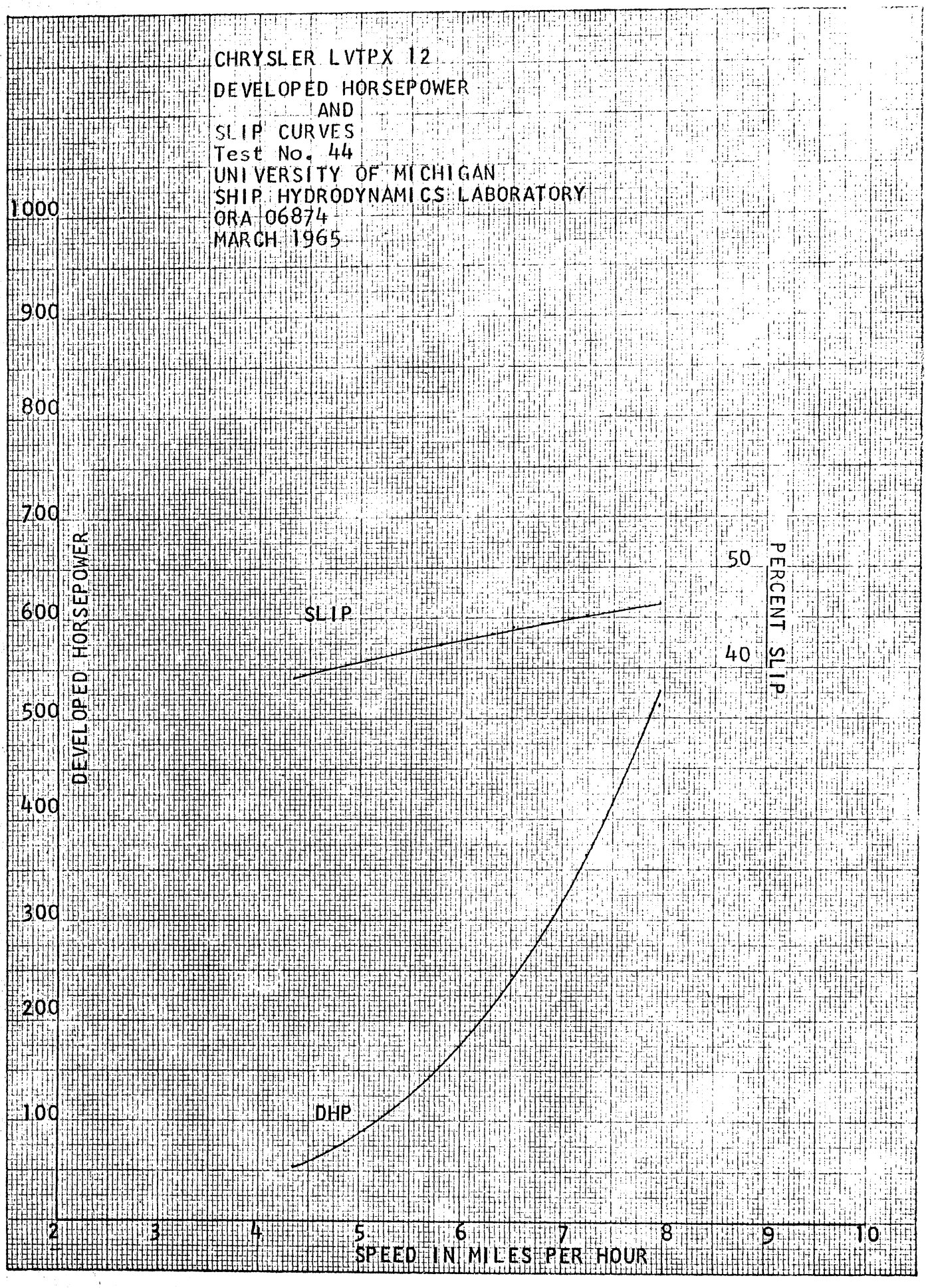
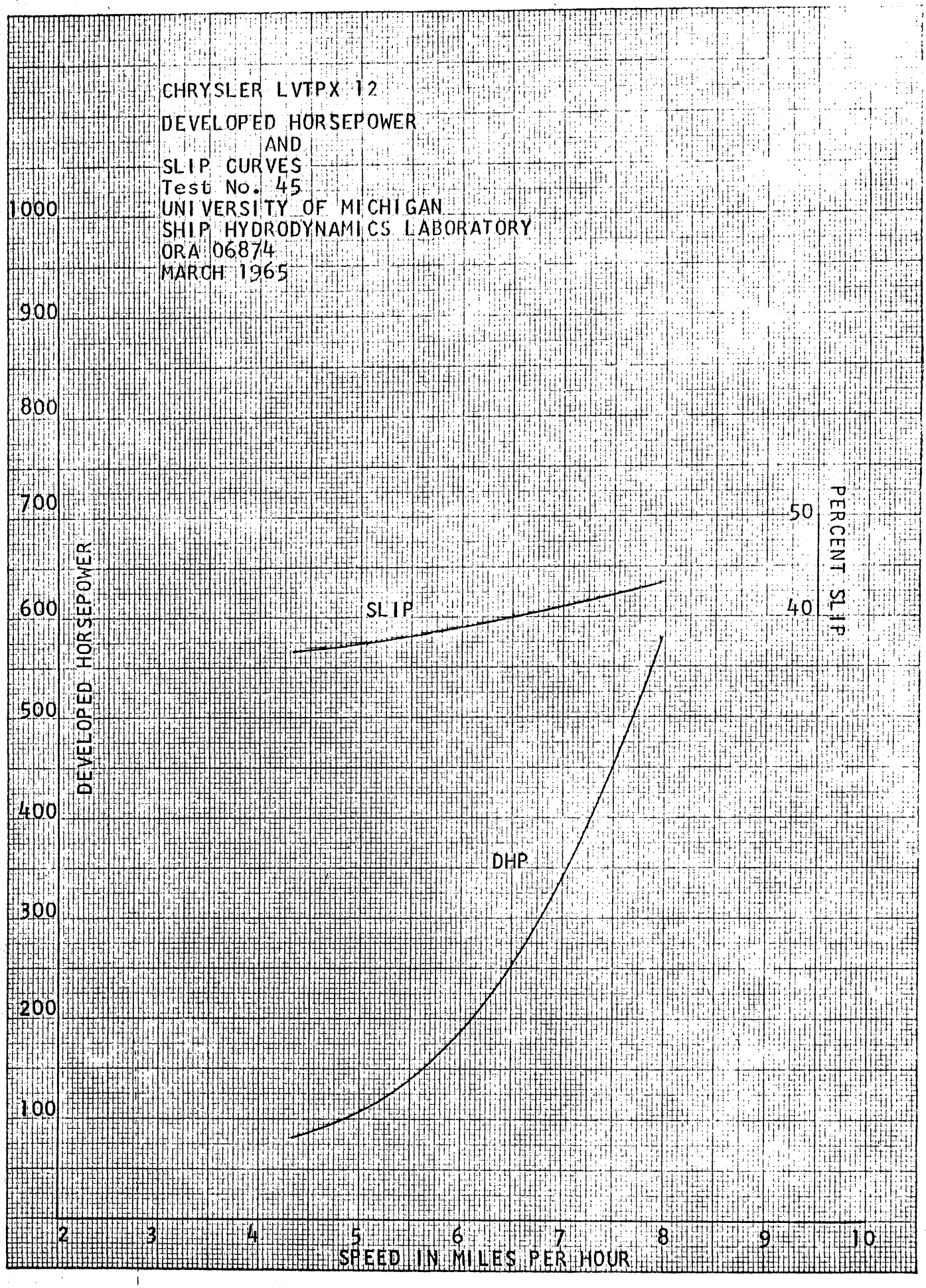
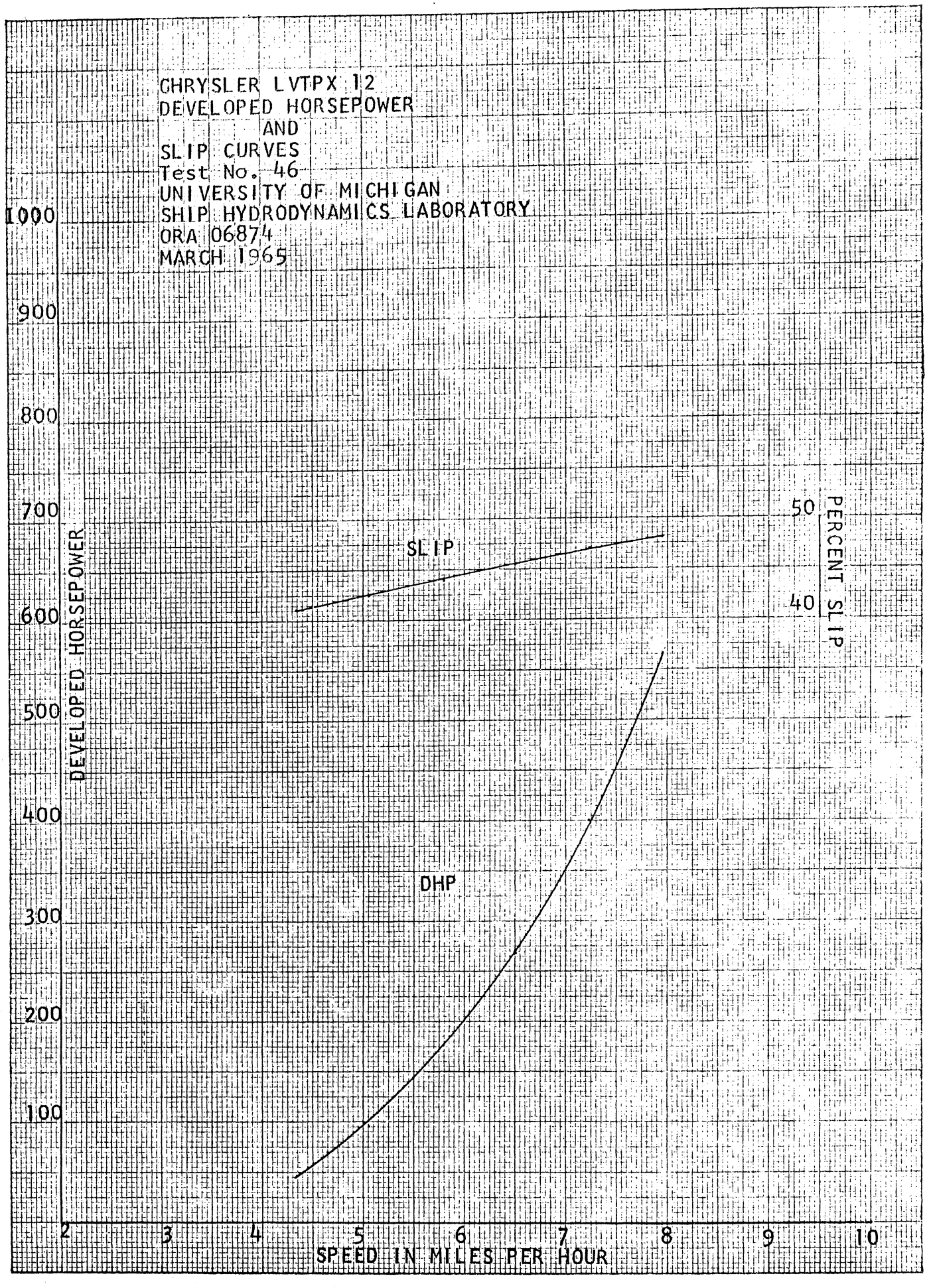

CHRYSLER LWTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 41
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
SLIP
DHP
DEVELOPED HORSEPOWER
PERCENT SLIP
SPEED IN MILES PER HOUR
1000
900
800
700
600
500
400
300
200
100
60
50
40
2
3
4
5
6
7
8
9
10

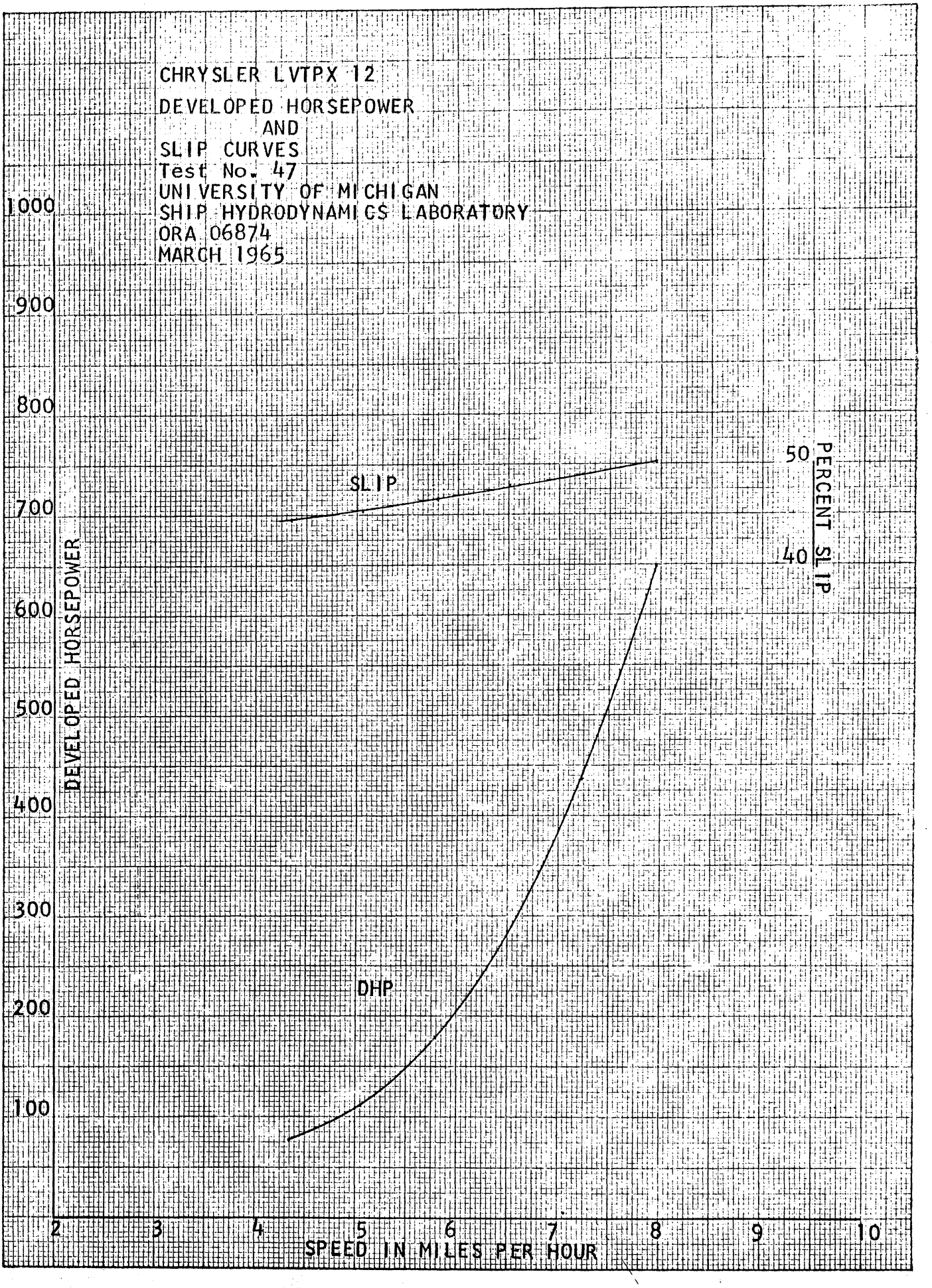


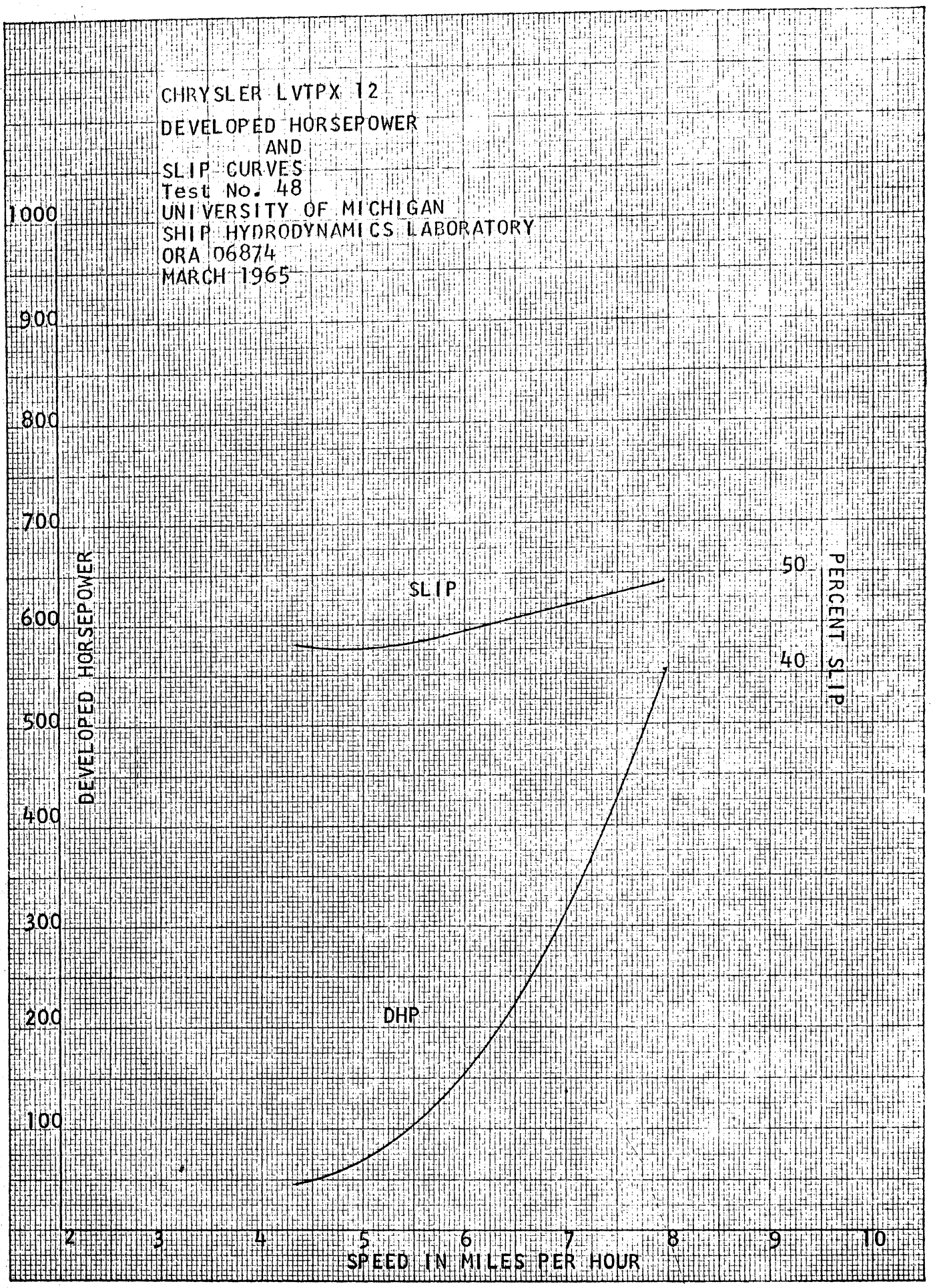

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 43
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
PERCENT SLIP
50
40
SLIP
DHP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

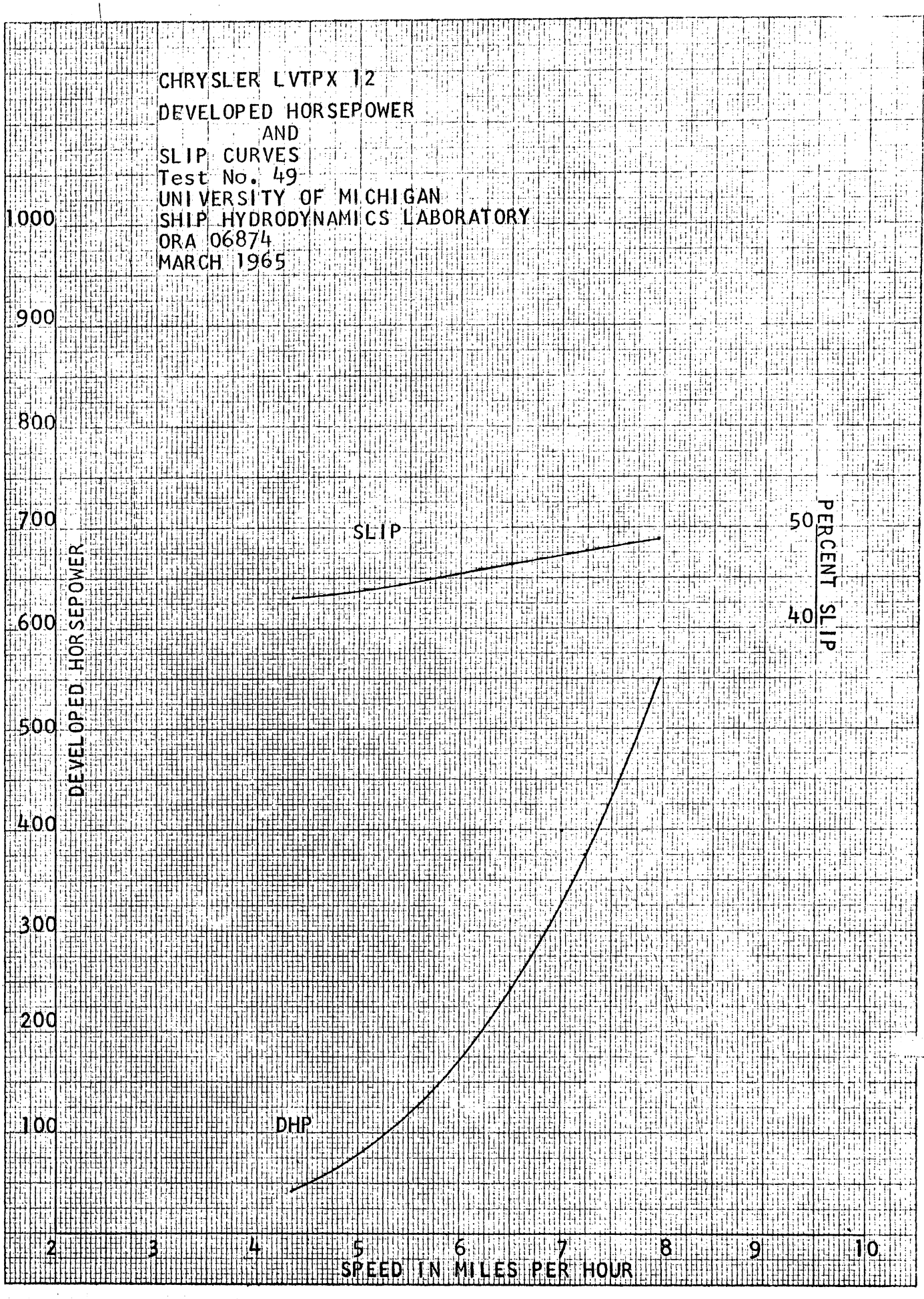

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 44
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

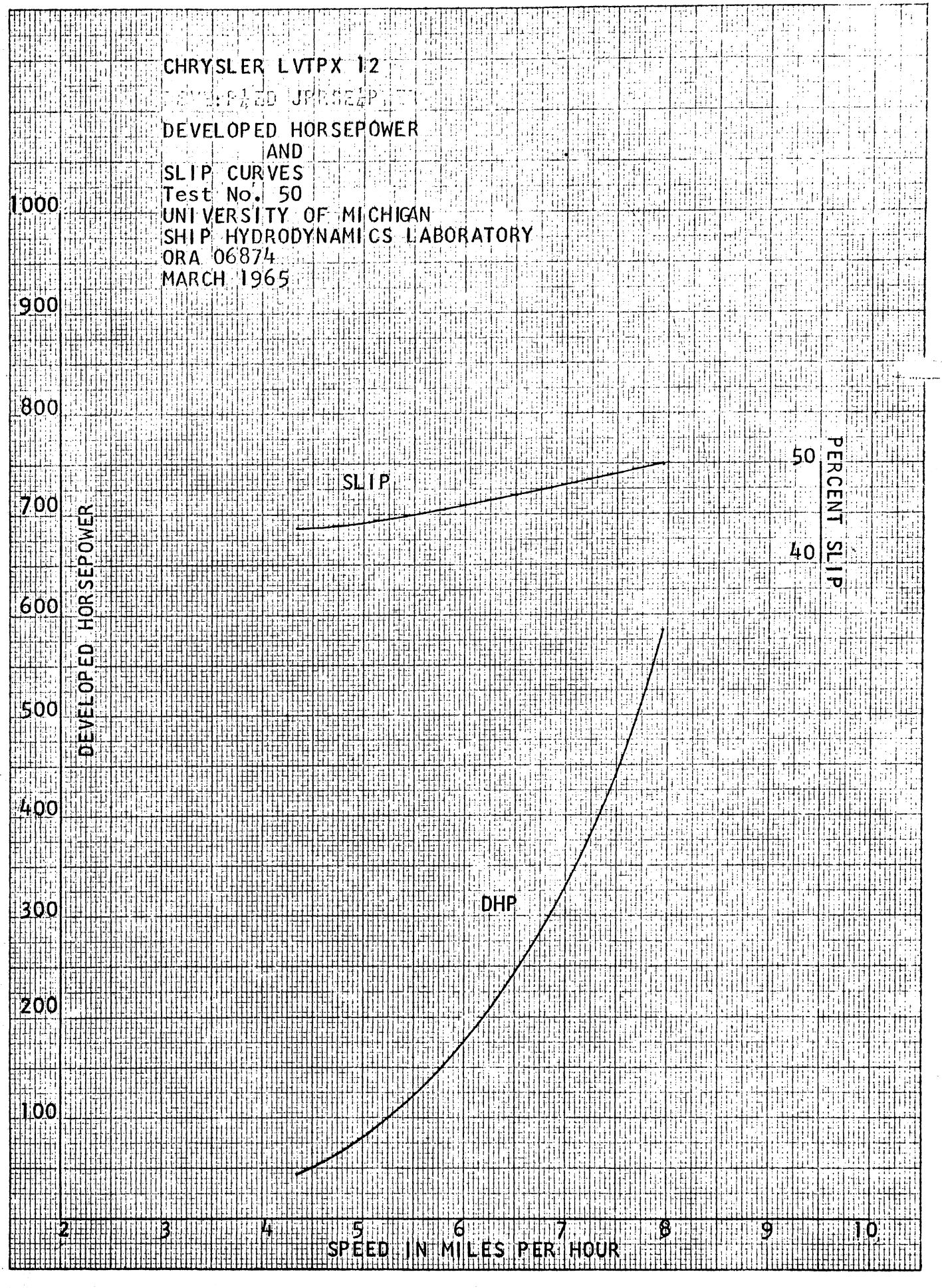

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 45
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
PERCENT SLIP
50
40
SLIP
DHP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 46
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
PERCENT SLIP
50
40
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 47
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
1000
900
800
700
600
500
400
300
200
100
DEVELOPED HORSEPOWER
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 48
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 49
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
PERCENT SLIP
50
40
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
Test No. 50
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
DEVELOPED HORSEPOWER
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
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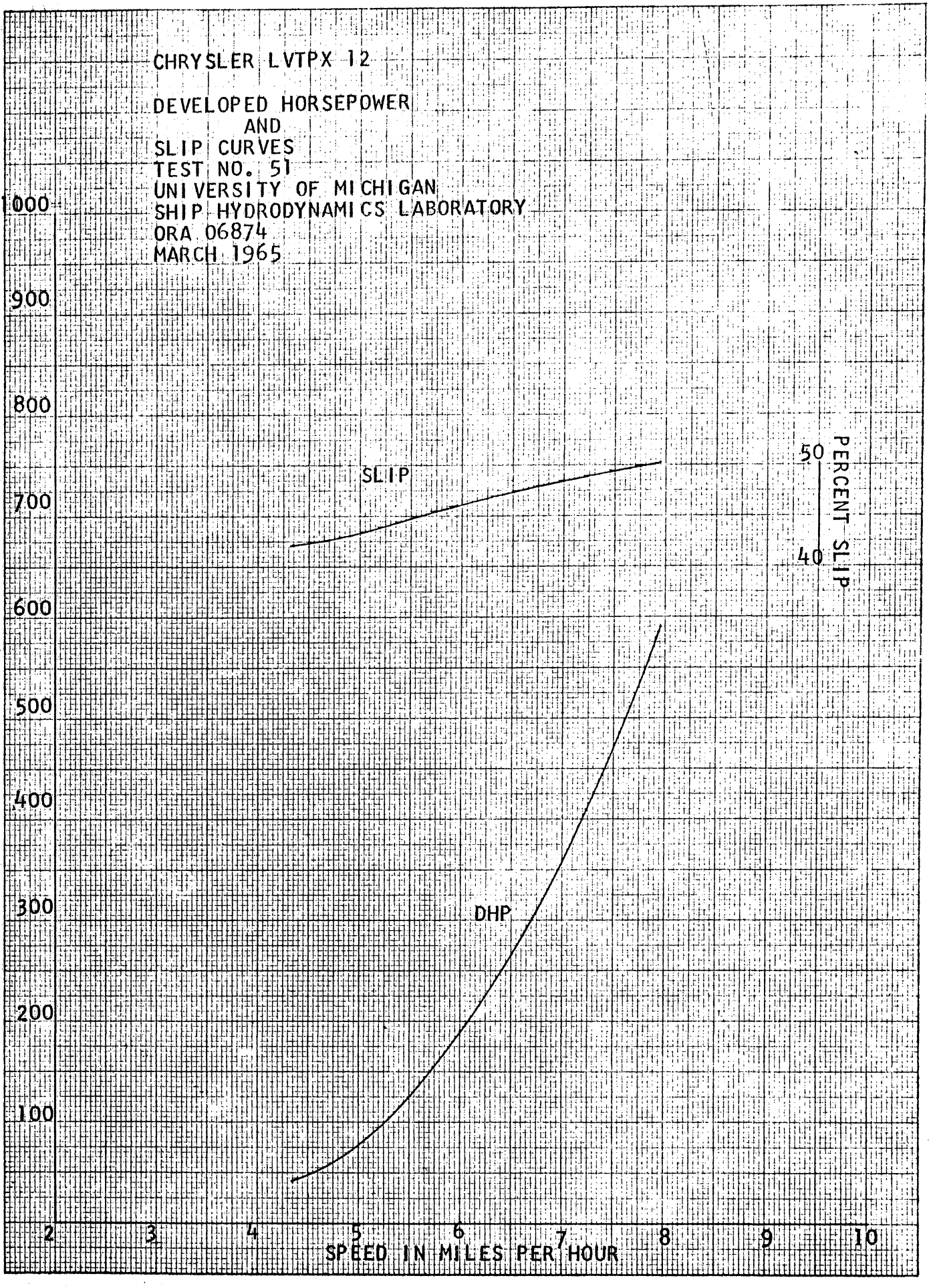
6
7
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 51
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
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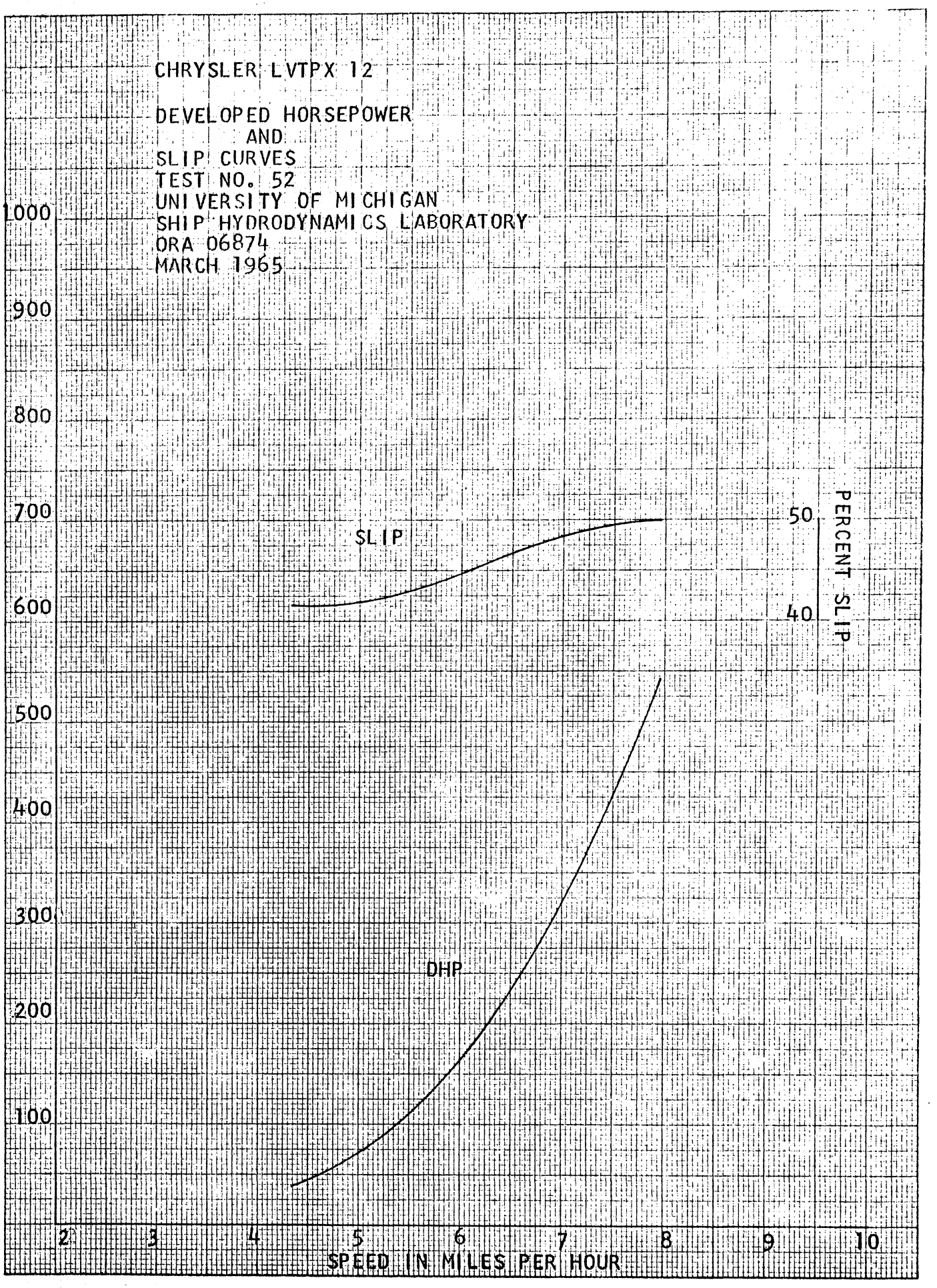
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 52
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
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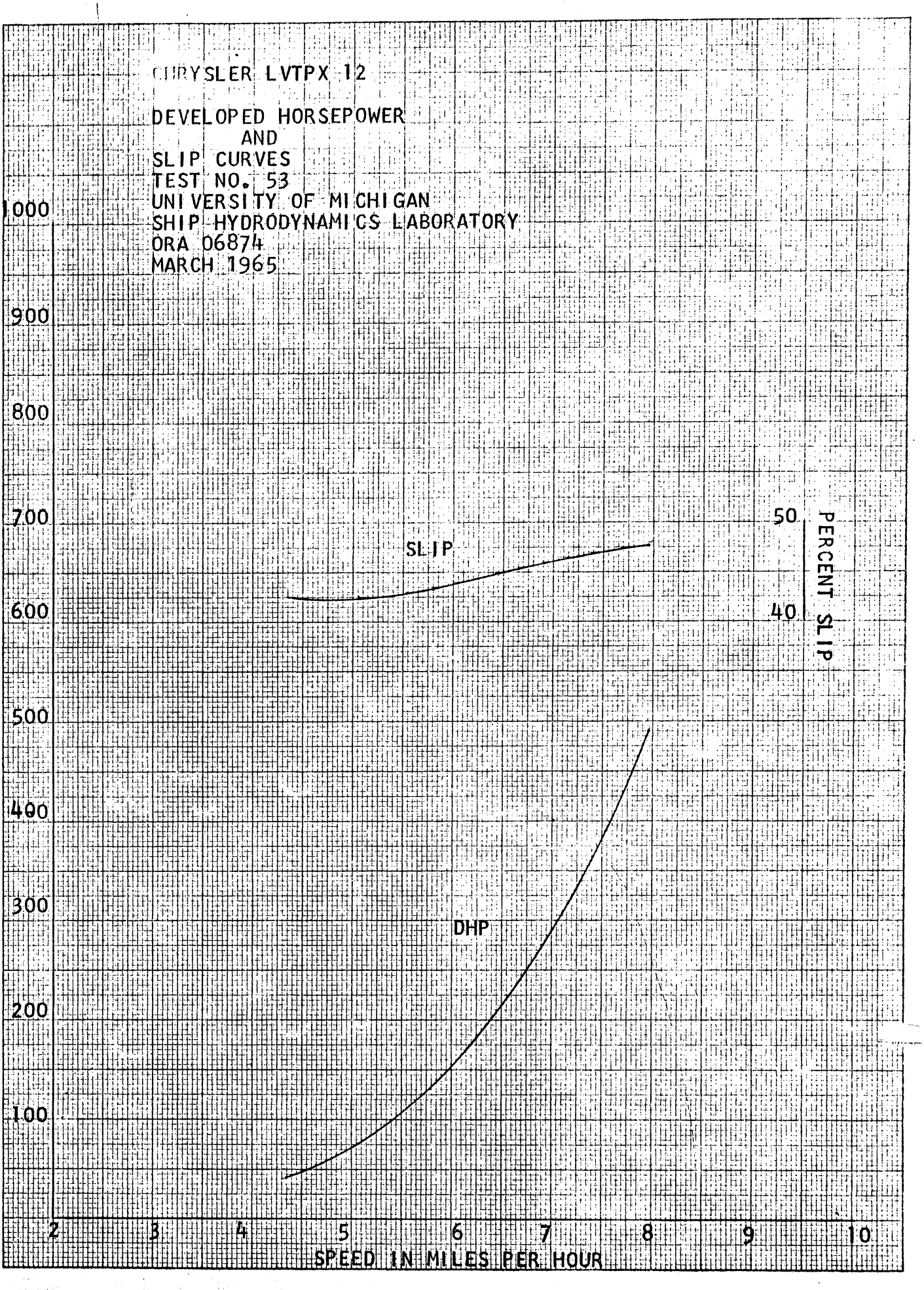
8
9
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 53
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
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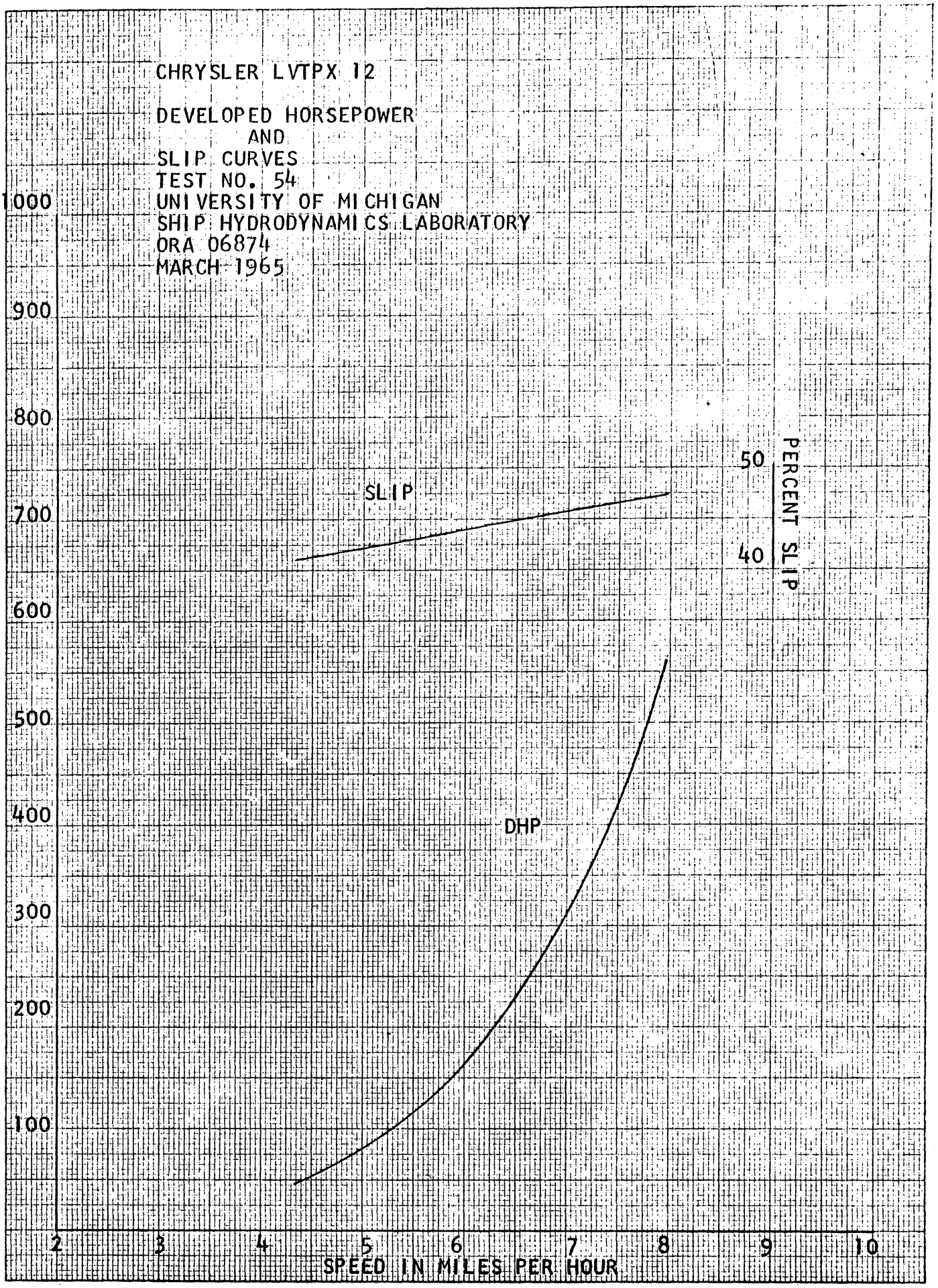
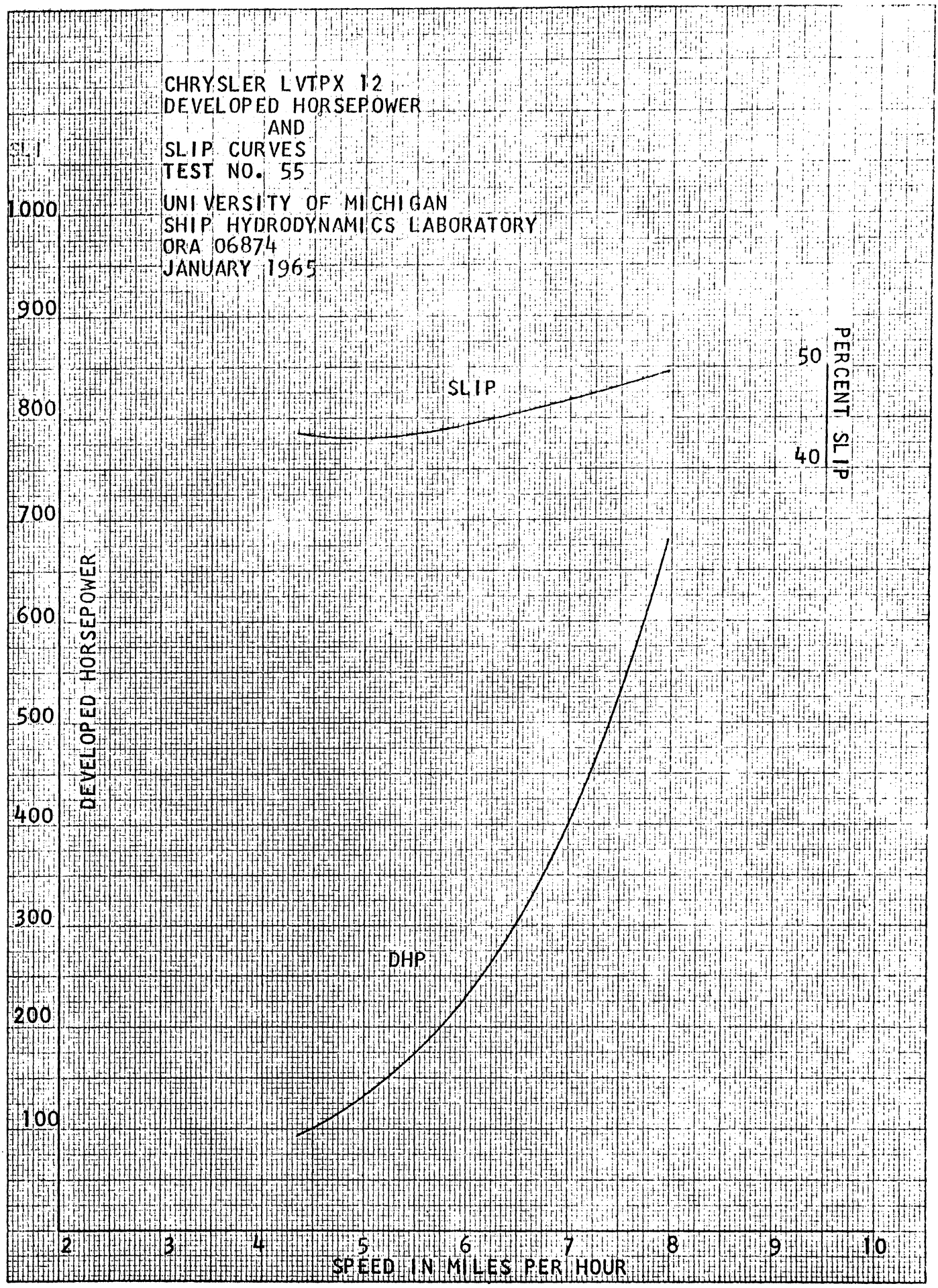
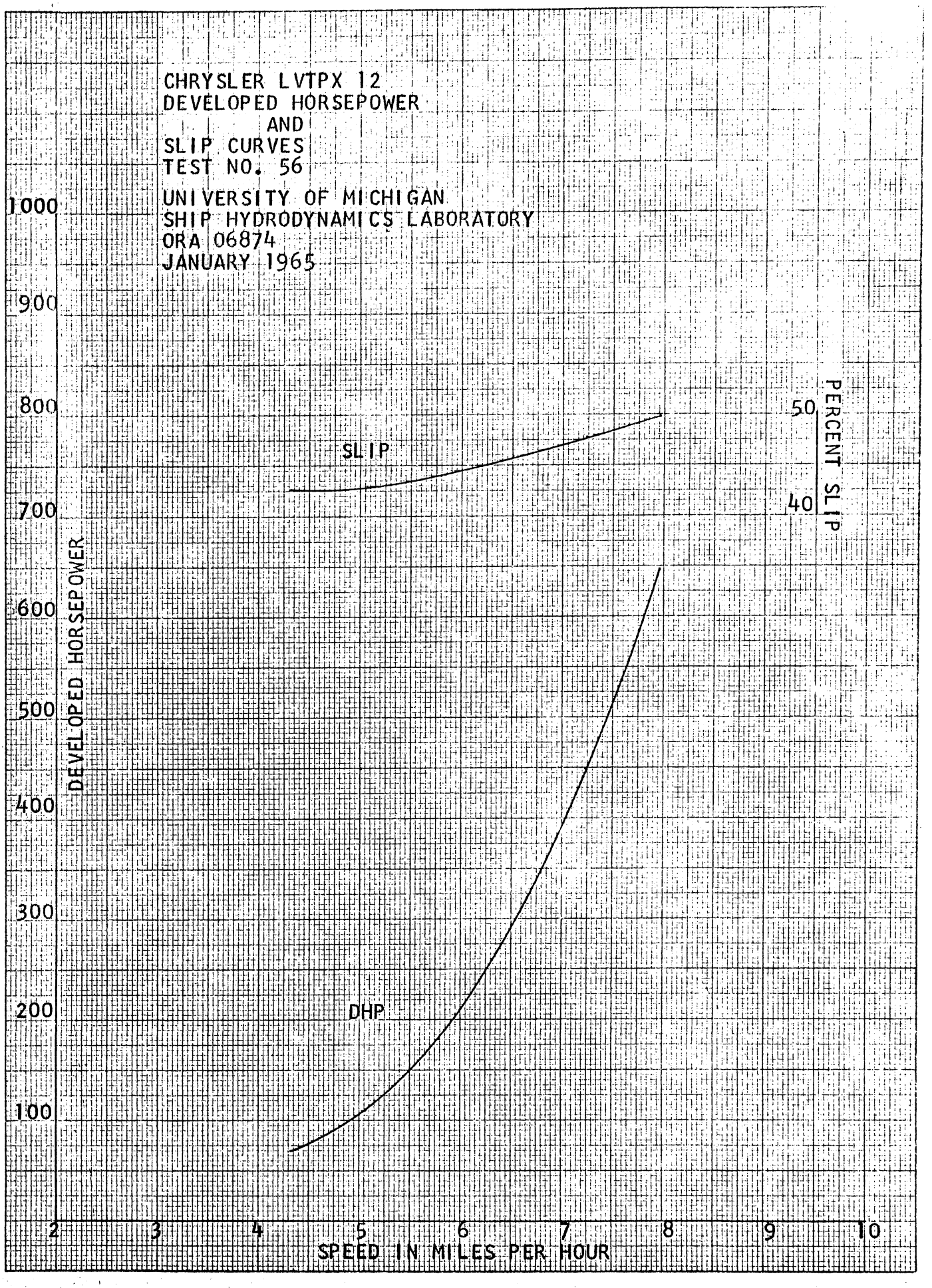
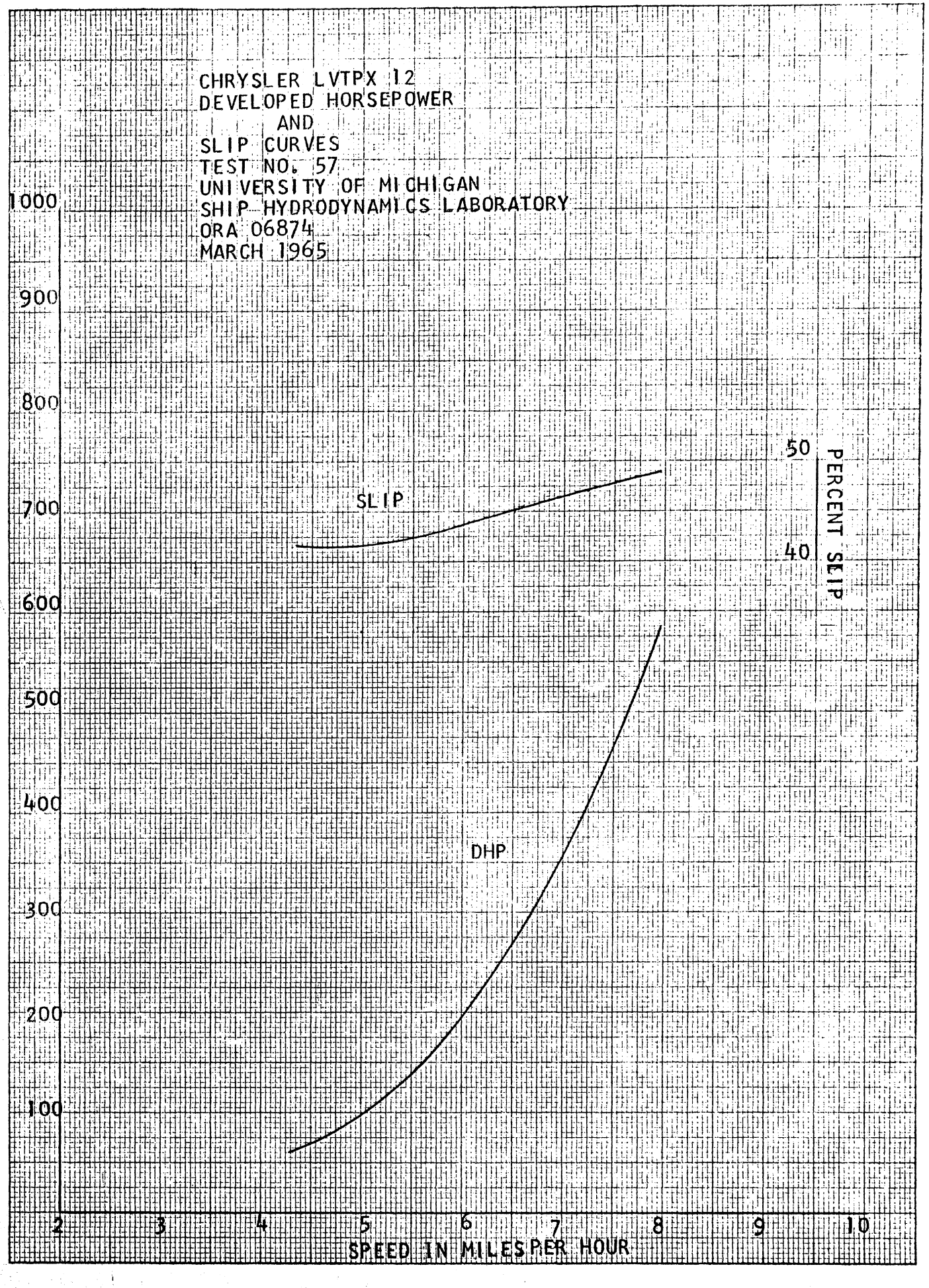
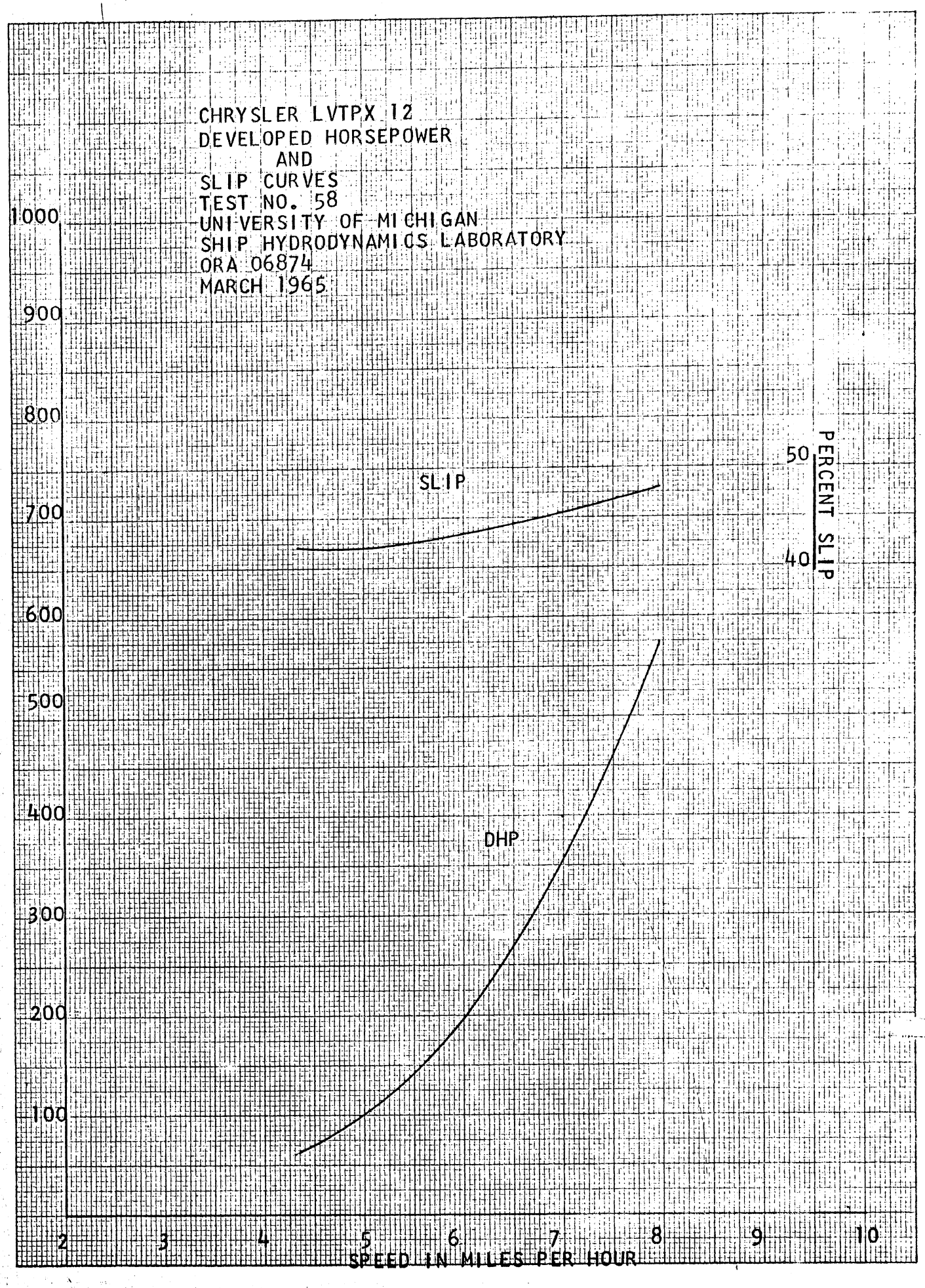
9
10
SPEED IN MILES PER HOUR

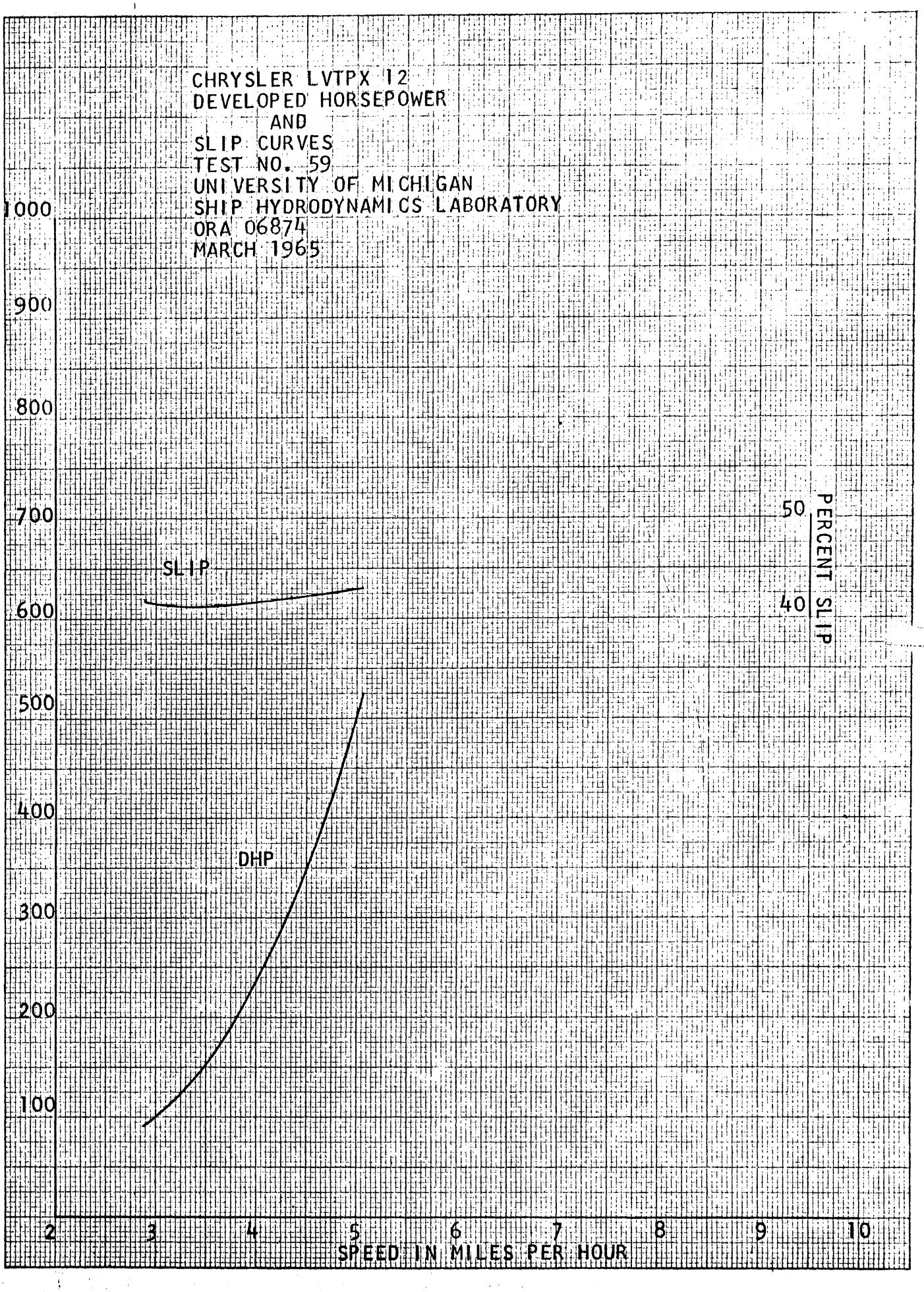

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 54
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

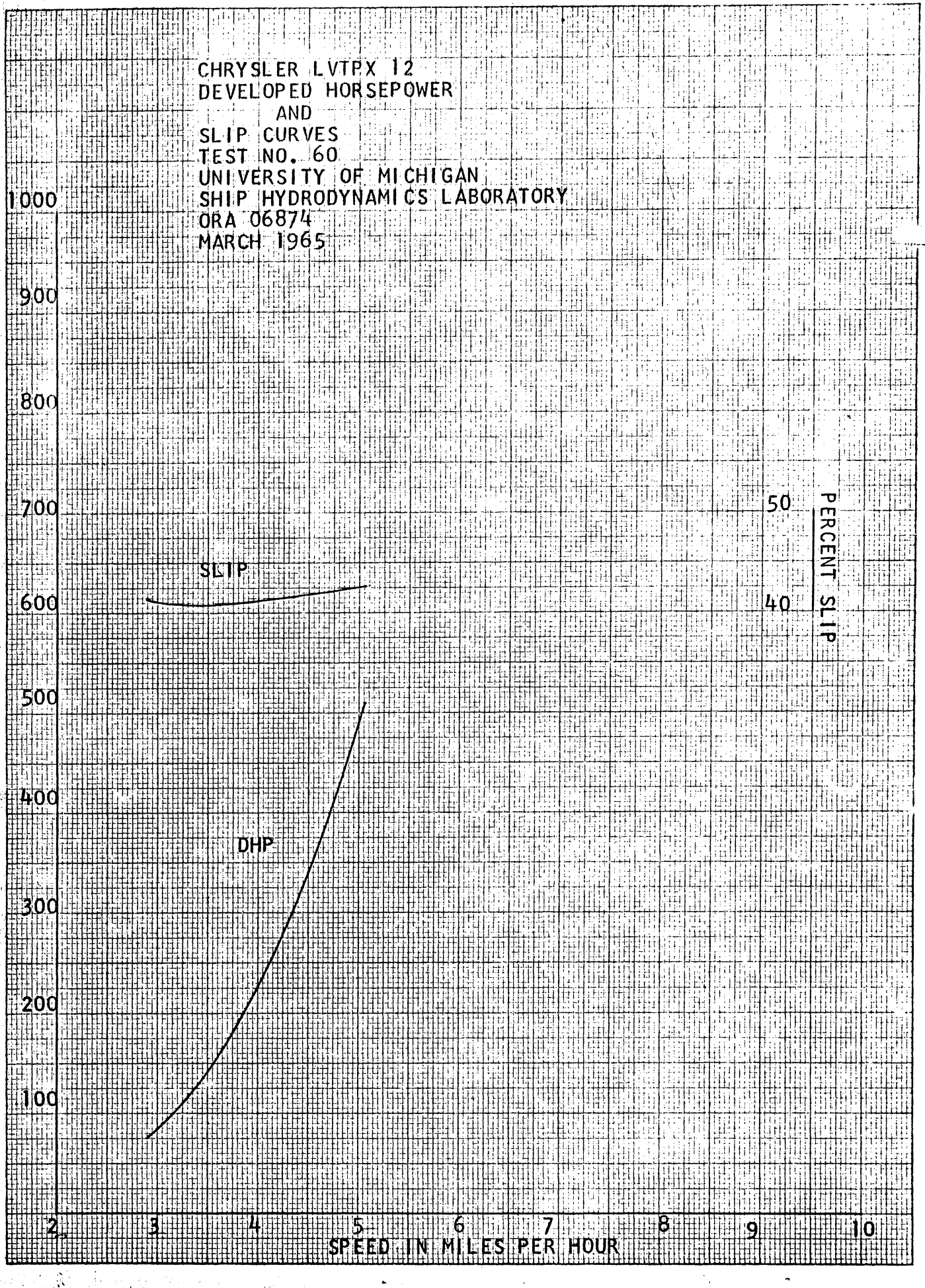

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 55
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
SLIP
DHP
DEVELOPED HORSEPOWER
PERCENT SLIP
SPEED IN MILES PER HOUR
1100
1000
900
800
700
600
500
400
300
200
100
50
40
2
3
4
5
6
7
8
9
10

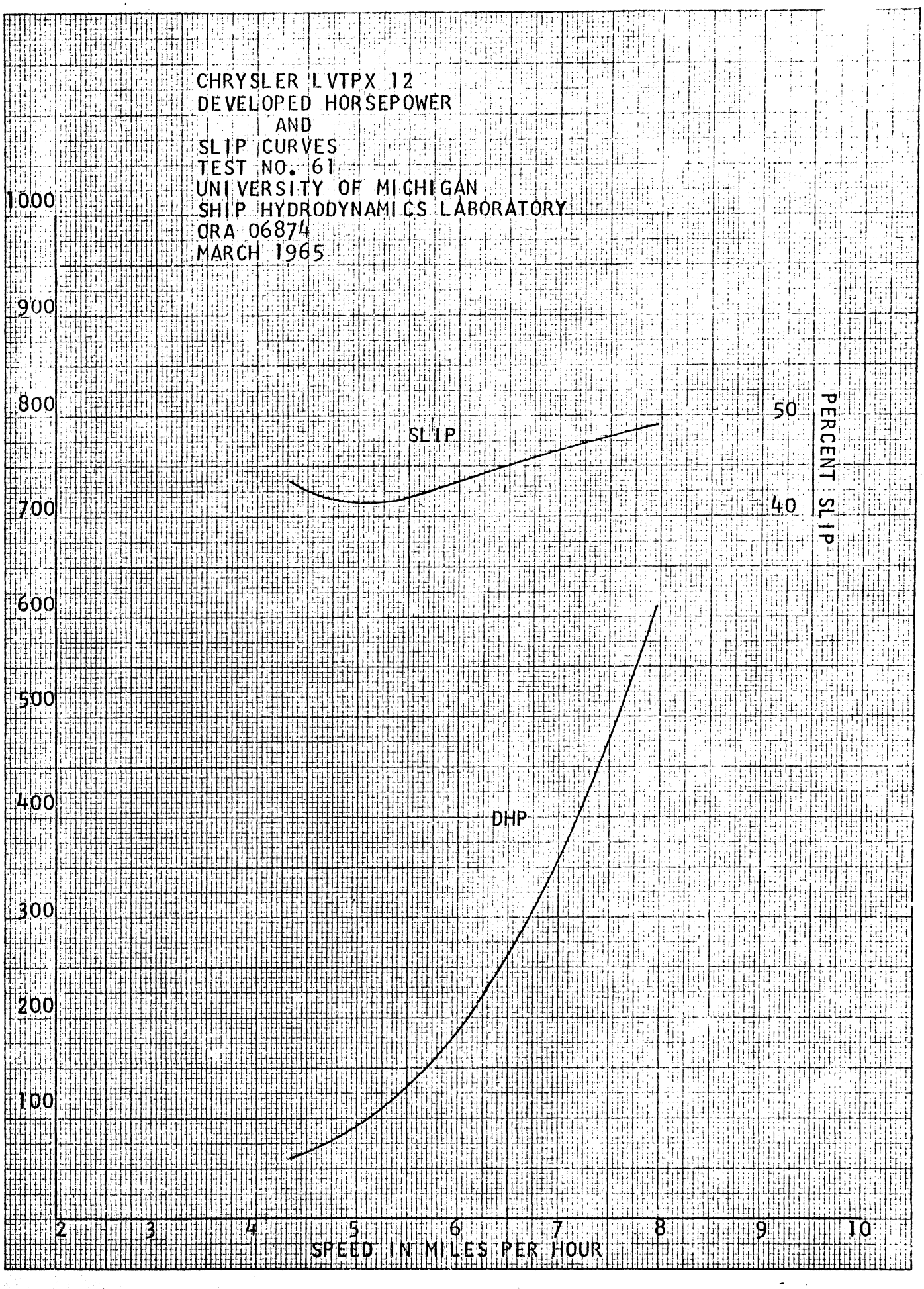

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 56
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
1000
900
800
700
600
500
400
300
200
100
DEVELOPED HORSEPOWER
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

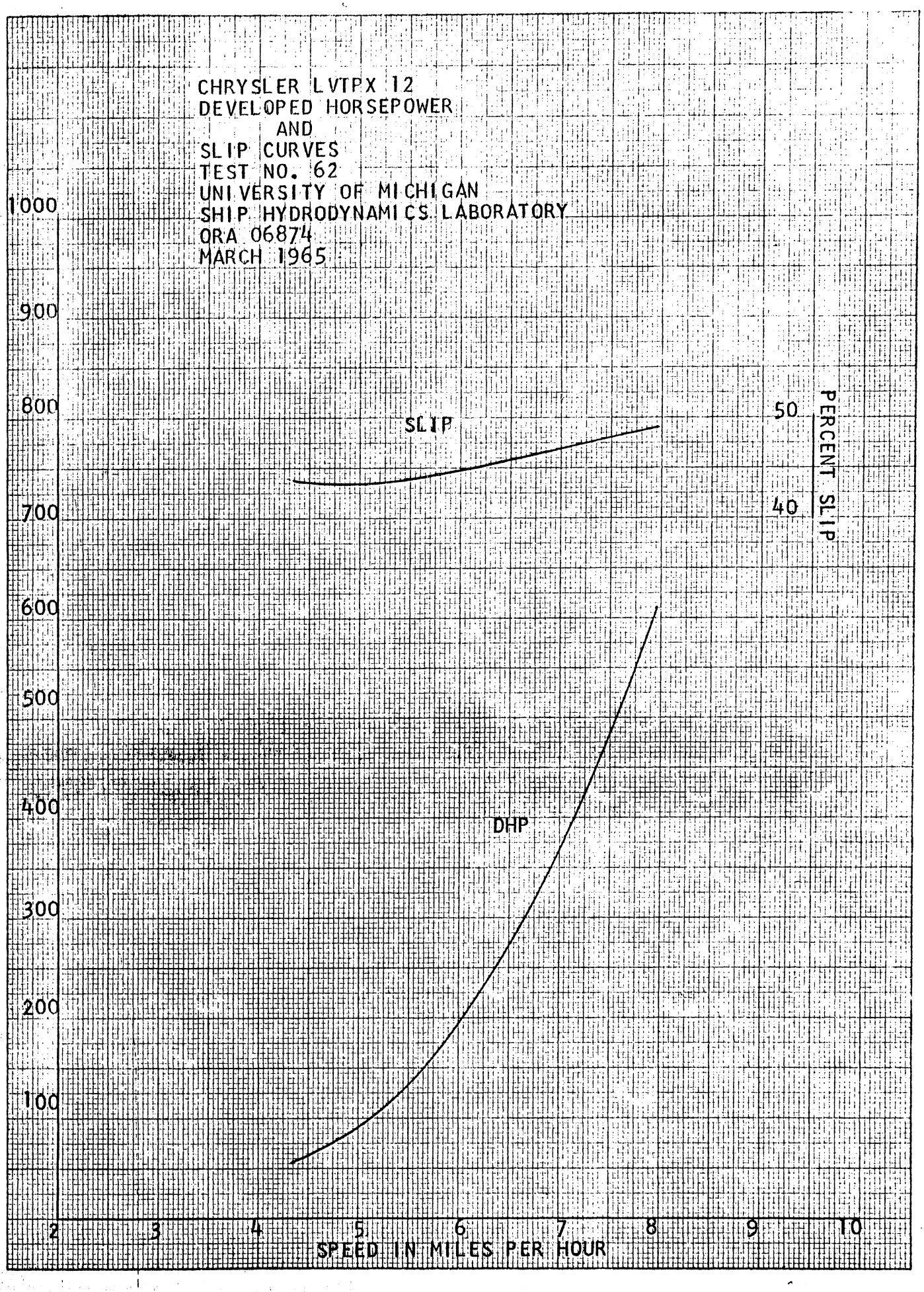

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 57
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

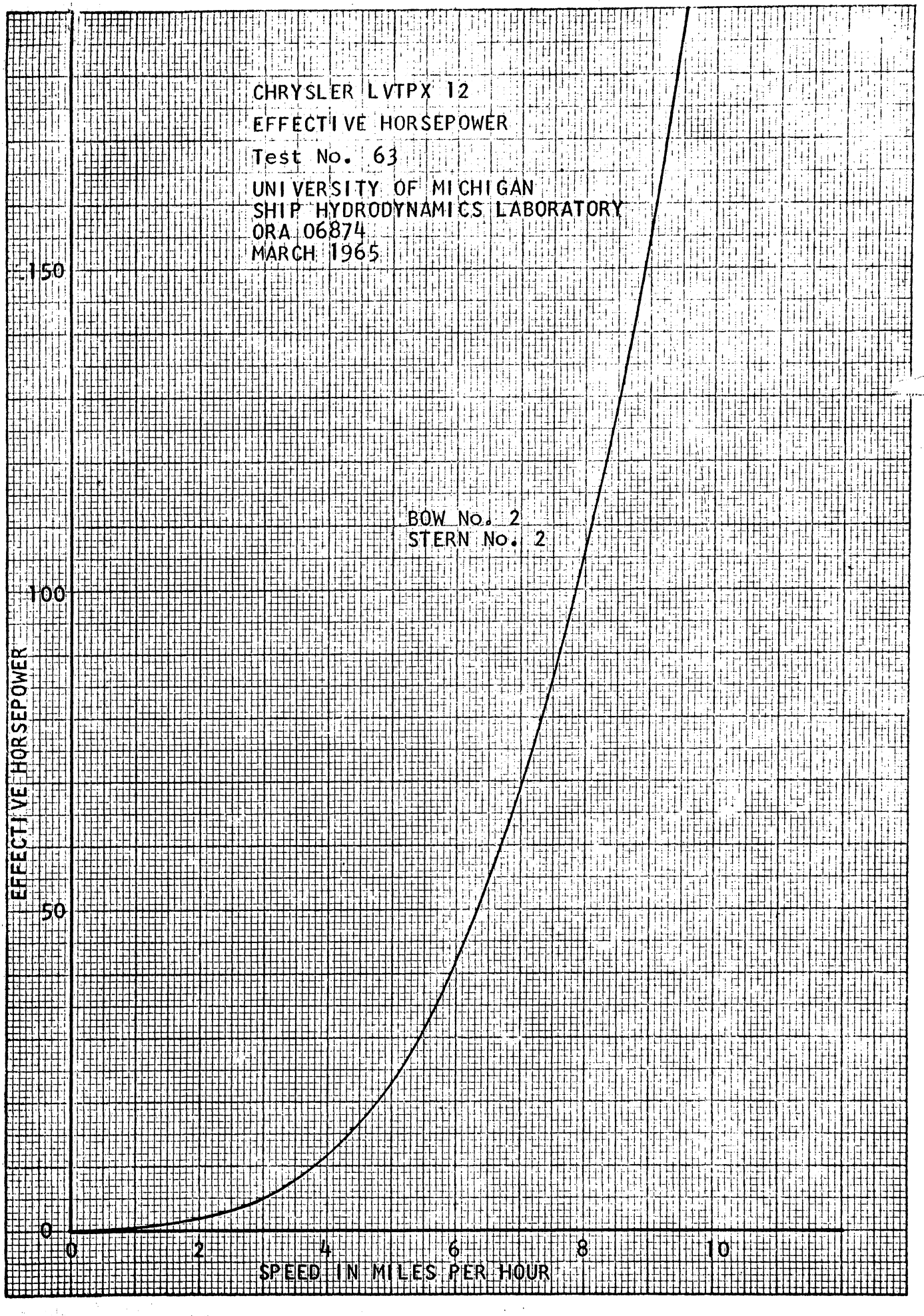

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 58
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

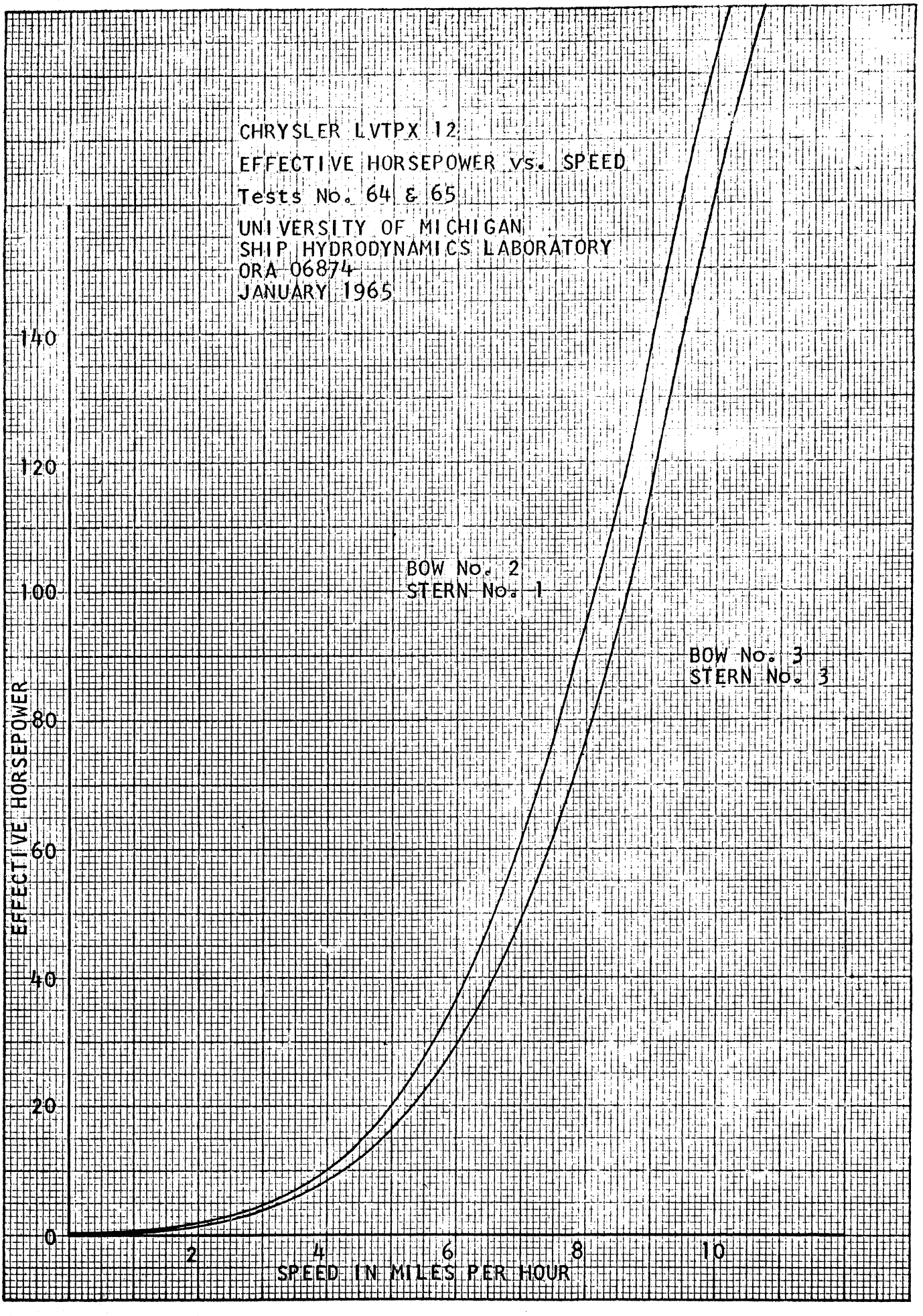

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 59
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

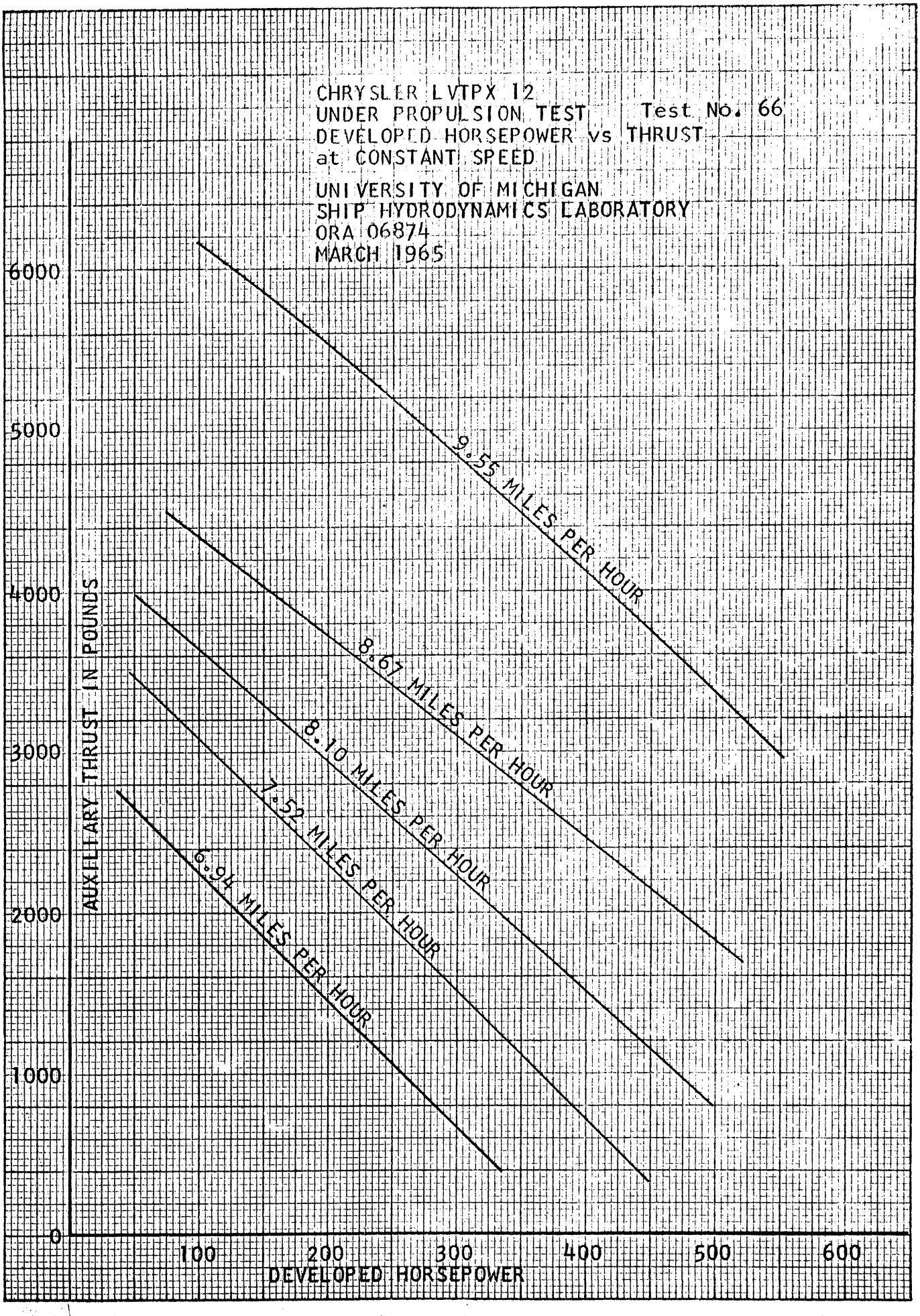

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 60
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

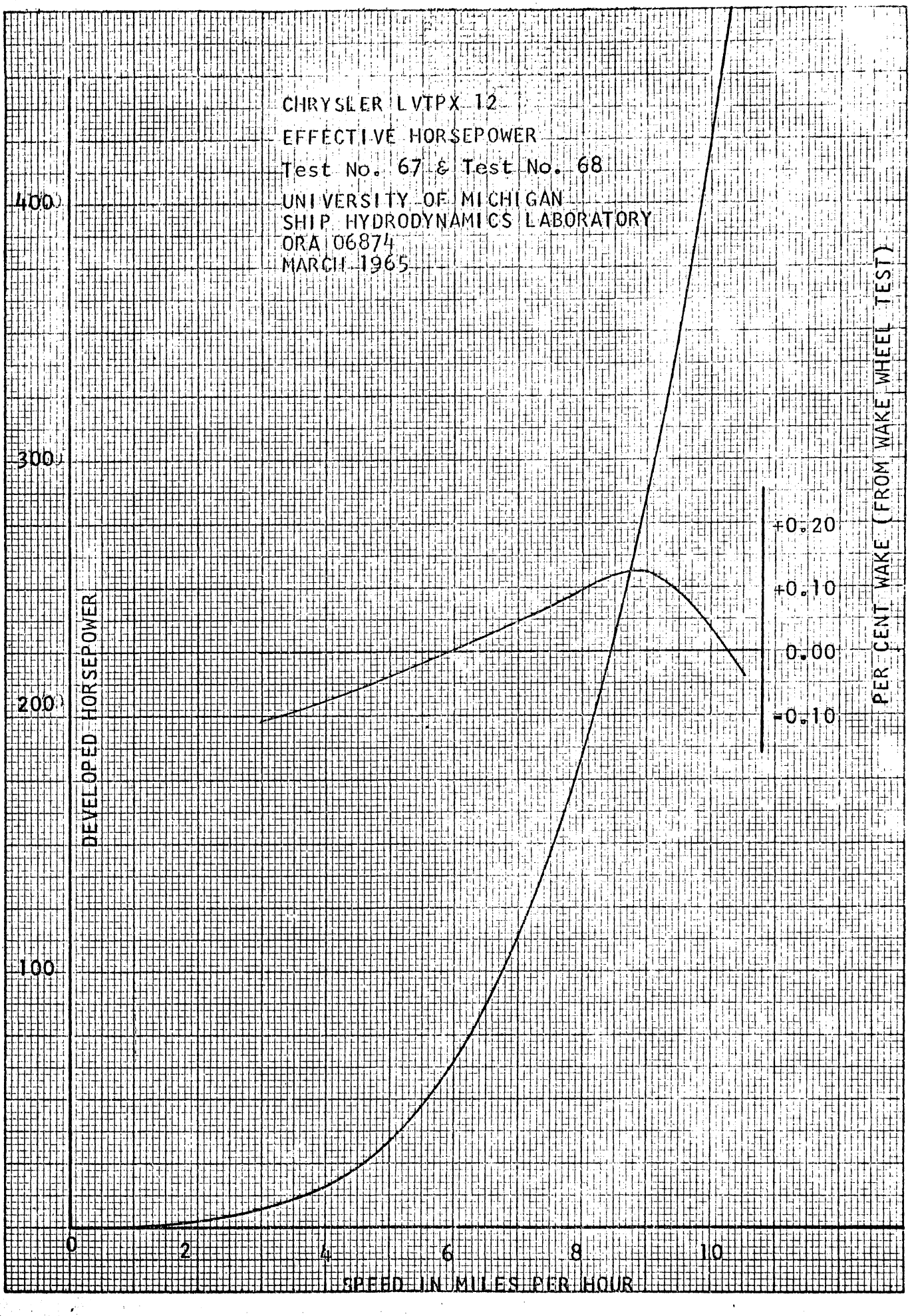

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 61
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

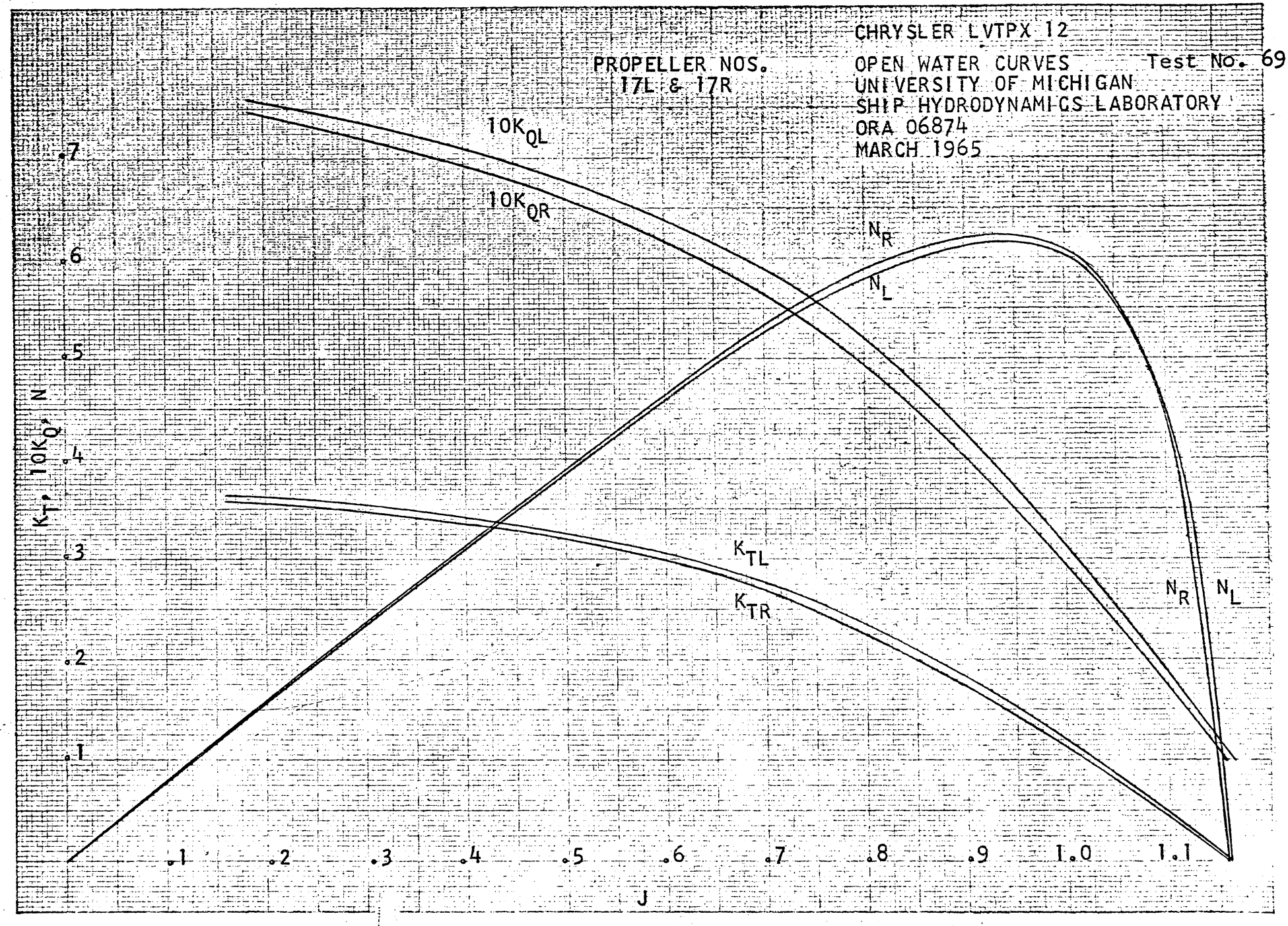

CHRYSLER LVTPX 12
DEVELOPED HORSEPOWER
AND
SLIP CURVES
TEST NO. 62
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
1000
900
800
700
600
500
400
300
200
100
SLIP
DHP
50
40
PERCENT SLIP
2
3
4
5
6
7
8
9
10
SPEED IN MILES PER HOUR

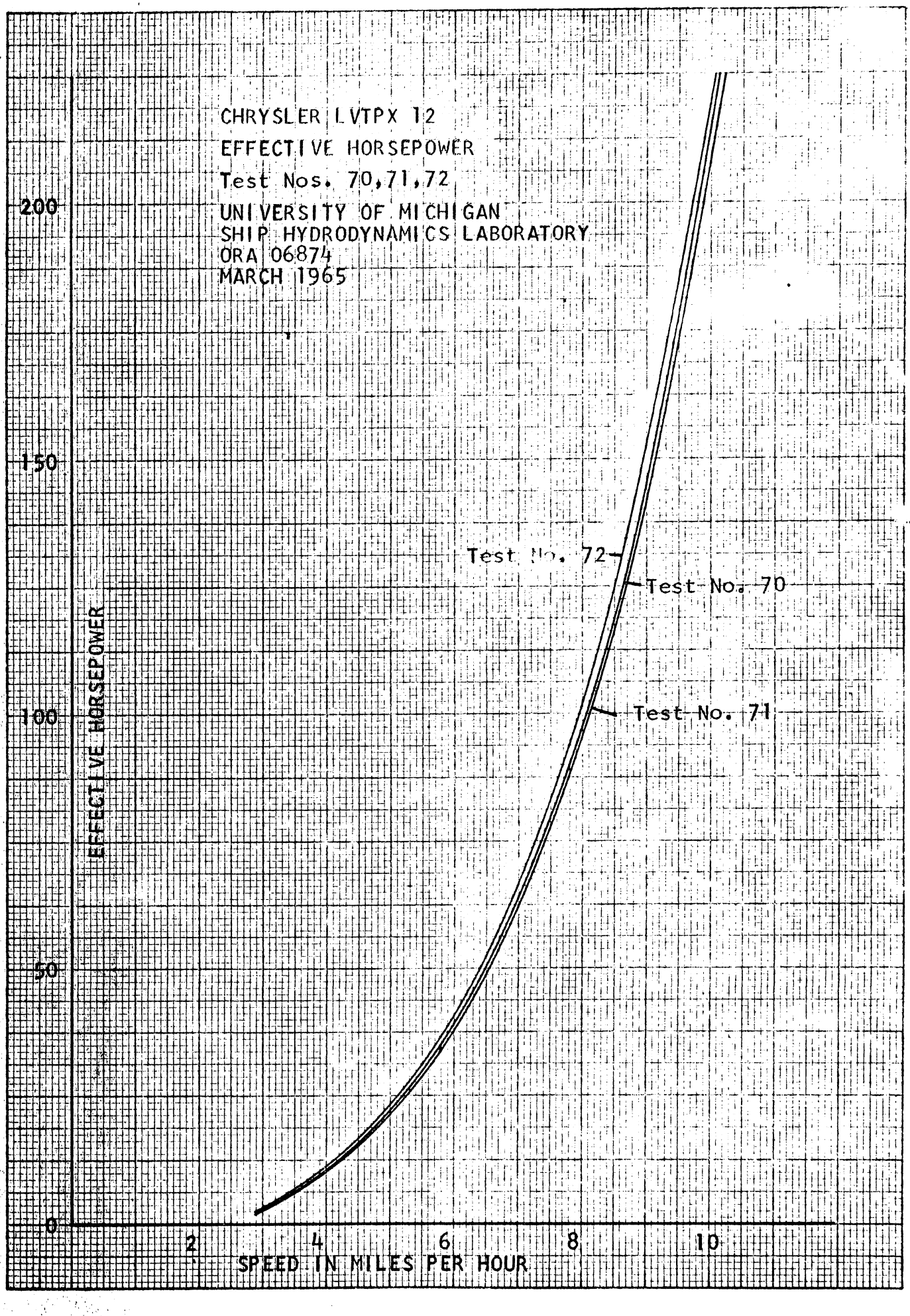

CHRYSLER LVTPX 12
EFFECTIVE HORSEPOWER
Test No. 63
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
BOW No. 2
STERN No. 2
EFFECTIVE HORSEPOWER
150
100
50
0
0
2
4
6
8
10
SPEED IN MILES PER HOUR

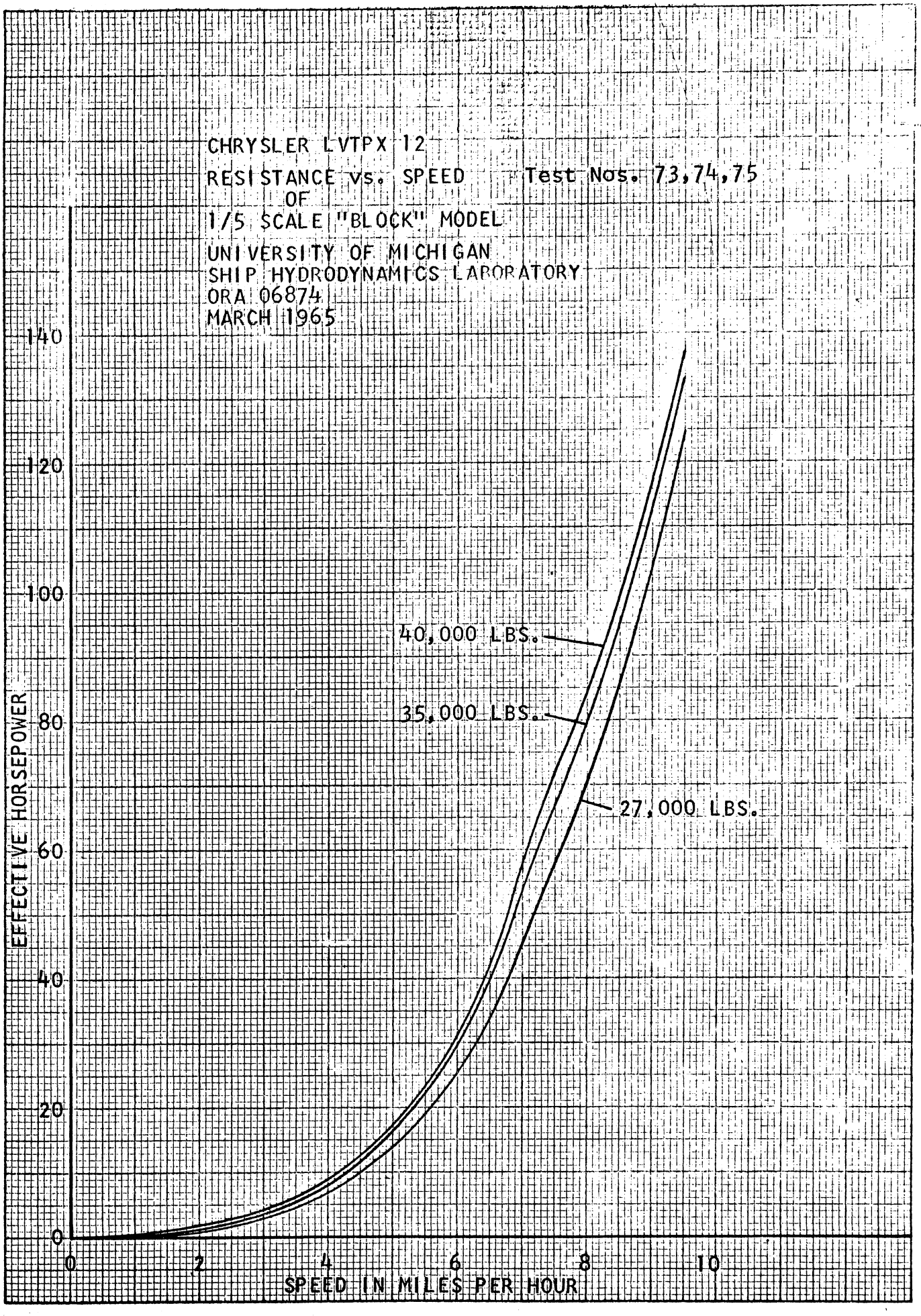

CHRYSLER LVTPX 12
EFFECTIVE HORSEPOWER vs. SPEED
Tests No. 64 & 65
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
JANUARY 1965
BOW No. 2
STERN No. 1
BOW No. 3
STERN No. 3
EFFECTIVE HORSEPOWER
0
20
40
60
80
100
120
140
2
4
6
8
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
UNDER PROPULSION TEST Test No. 66
DEVELOPED HORSEPOWER vs THRUST
at CONSTANT SPEED
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
9.55 MILES PER HOUR
8.67 MILES PER HOUR
8.10 MILES PER HOUR
7.52 MILES PER HOUR
6.94 MILES PER HOUR
AUXILIARY THRUST IN POUNDS
0
1000
2000
3000
4000
5000
6000
100
200
300
400
500
600
DEVELOPED HORSEPOWER


CHRYSLER LVTPX 12
EFFECTIVE HORSEPOWER
Test No. 67 & Test No. 68
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
400
300
200
100
DEVELOPED HORSEPOWER
+0.20
+0.10
0.00
-0.10
PER CENT WAKE (FROM WAKE WHEEL TEST)
0
2
4
6
8
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
PROPELLER NOS.
17L & 17R
OPEN WATER CURVES
Test No. 69
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
$10K_{QL}$
$10K_{QR}$
N_R
N_L
K_{TL}
K_{TR}
K_T, $10K_Q$, N
J
.7
.6
.5
.4
.3
.2
.1
.1
.2
.3
.4
.5
.6
.7
.8
.9
1.0
1.1


CHRYSLER LVTPX 12
EFFECTIVE HORSEPOWER
Test Nos. 70,71,72
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
200
150
100
50
0
EFFECTIVE HORSEPOWER
Test No. 72
Test No. 70
Test No. 71
2
4
6
8
10
SPEED IN MILES PER HOUR


CHRYSLER LVTPX 12
RESISTANCE vs. SPEED OF
1/5 SCALE "BLOCK" MODEL
Test Nos. 73,74,75
UNIVERSITY OF MICHIGAN
SHIP HYDRODYNAMICS LABORATORY
ORA 06874
MARCH 1965
EFFECTIVE HORSEPOWER
0
20
40
60
80
100
120
140
40,000 LBS.
35,000 LBS.
27,000 LBS.
0
2
4
6
8
10
SPEED IN MILES PER HOUR