For the benefit of the readers of this magazine, we give herewith sample brake cards in order that some idea may be gained of just how the data is secured, that is later used in determining gold medal winners.

The brake itself is what is known as the friction type, and is the same as has been used in all the competitions at Winnipeg since 1909.

The brake tests to the uninitiated are the least spectacular and require the most explanation. If you will but imagine the brake a separator you have solved the problem, the only difference being that an apparatus is provided whereby the exact load of the engine can be measured in horse power. This load is secured by means of a rope friction. The process by which it is determined is very simple. A great many years ago it was decided that one horse power was the power required to raise thirty-three thousand pounds one foot in a minute, and in measuring the horse power on the brakes you have three things to contend with: time, distance and the load. The load is the number of pounds of pull upon the rope caused by the friction upon the rapidly revolving drums. The apparatus is so arranged that the pull is downward and this pull is pressed upon a platform scales. The distance is the circumference of the center of the rope and the time is the number of revolutions per minute. Therefore, the load multiplied by the circumference in feet and the number of revolutions per minute and divided by thirty-three thousand gives the horse power.

It would be possible to apply a similar apparatus to the cylinder pulley of a separator and measure at all times just the horse power that is required to drive the machine.

In handling the brake test, it requires at least two observers, one for the engine and one for the brake. The brake observer's charts when finished would appear something like Nos. 1 and 2. Space does not permit our giving sample engine charts.

On chart No. 1, under the heading "Time," the spaces are divided into five minute intervals. The next heading carries the readings of the revolution counter as a whole and in the sample chart it can be seen that a start was made with the counter set at 512, and that it registered 39462 at the end of two hours. The brake wheel thus made 38950 revolutions, which divided by 120 minutes (the number in two hours would give an average of 324.6 revolutions per minute.

The next column represents the number of revolutions at five minute intervals, and the fourth column represents the number of revolutions per minute at five minute intervals.

The gross load is the total load as shown by the scales, and as the weight of the levers, ropes, etc., were 104 pounds, the net pull was 284 pounds. This pull was kept constant at all times, the friction on the brake wheel being so adjusted as to keep it so. The figures in the column headed "net" would, of course, vary with the size of the engine being tested. Now as to arriving at the horse power. If we take the average of the figures in the column headed (Rev. per Min.), we find it to be 324+. The average load was 284 lbs. The average load muitiplied by the average revolutions per minute times the distance from the centre of the wheel to the centre of the rope divided by 33000 gives the average horse power developed, which in the case in point would be 33.6 horse power. In a two hours run at this rate, it would mean an equivalent of 67.2 horse power hours, and if it used 98.8 lbs. of fuel it would mean a fuel consumption of 1.47 lbs. per horse power hour.

Charts 3 and 4 are self explanatory. In fact only approximate figures have been given and this has been done simply to show that the results arrived at in a motor competition are not mere pieces of guess work, but real cold hard facts.

Several engines were entered in the 1912 competition that failed to put in an appearance, some for one reason and some for another. Of those that did show up, three were held by the judges as not being elegible for entry on account of their similarity to other engines entered in the same classes by the same contestants. The M. Rumely Co., J. I. Case Threshing Machine Co., and the Canadian Heer Co. were each thus deprived of one entry.

When the final adjustments had been made the engines named below were found to be on hand and eligible for the tests according to the following classification:

(a) Gasoline engines whose piston displacement is 300 cubic feet per minute and under.

(b) Gasoline engines whose piston displacement is over 300 and under 500 cubic feet per minute.

(c) Gasoline engines whose piston displacement is 500 cubic feet per minute and over.

(d) Kerosene engines whose piston displacement is under 500 cubic feet per minute.

(e) Kerosene engines whose piston displacement is 500 cubic feet per minute and over.

(The piston displacement to be calculated on a basis of a piston

The Judges and observers posing in the Brake Shed.

CHART 1

Time	Revolution counter readings	Revolutions in 5 minutes	Revolutions per minute	Load Gross	Tare	Net
130	512		324	388	104	284
135	2232	1720	344	"	"	284
140	3842	1610	322	"	"	284
145	5467	1625	325	"	"	284
150	7082	1625	325	"	"	284
155	8707	1615	323	"	"	284
200	10427	1720	344	"	"	284
205	12147	1720	344	"	"	284
210	13867	1720	344	"	"	284
215	15587	1720	344	"	"	284
220	17197	1610	322	"	"	284
225	18797	1600	320	"	"	284
230	20387	1590	318	"	"	284
235	21967	1580	316	"	"	284
240	25542	1575	315	"	"	284
245	25197	1585	317	"	"	284
250	26787	1600	320	"	"	284
255	28374	1620	324	"	"	284
300	29967	1620	324	"	"	284
305	31577	1610	322	"	"	284
310	33167	1590	318	"	"	284
315	34747	1580	316	"	"	284
320	36317	1570	314	"	"	284
325	37892	1575	315	"	"	284
330	39462	1570	314	"	"	284

Observer *John Doe*

(over)

CHART 2

1912
MOTOR COMPETITION

Canadian Industrial Exhibition
Winnipeg

BRAKE TEST

Economy

Brake No. *1* **Data**

Date of Test *July 5, 1912*

Entry No. **Make and Size**

Steam **Gasoline** X **Kerosene**

Fuel at Start *324 25 lbs.*

Fuel at Finish *225 45* "

Fuel Consumed *98 8* "

Water at Start
Water at Finish *No water used*
Water Consumed

Load *284 lbs.*

Time of Start *1.30 P.M.*

Time of Finish *3.30 P.M.*

Total Time of Test *2 hrs.*

Total Time Lost *None*

Actual Time of Test *2 hours*

Time Lost

.....**to**..... **Cause**.....

.....**to**..... **Cause**.....

.....**to**..... **Cause**.....

.....**to**..... **Cause**.....

Observer *John Doe*

(over)

A familiar scene in the Brake Shed during several days.