perpendicular to the paper from back to front is defined as a Z-axis direction. The X-axis direction and the Y-axis direction are horizontal directions orthogonal to each other, and the Z-axis direction is a vertical direction. In the description of the flat-type tire testing device 1000, unless otherwise specified, the front-rear, left-right, and top-bottom directions are defined as directions when looking in a traveling direction of a carriage 20 (X-axis positive direction). That is, the X-axis positive direction is referred to as front, the X-axis negative direction is referred to as back, the Y-axis positive direction is referred to as left, the Y-axis negative direction is referred to as right, the Z-axis positive direction is referred to as top, and the Z-axis negative direction is referred to as bottom.

[0019] The flat-type tire testing device 1000 includes a track part 10 and a road surface part 60 which are elongated in the X-axis direction, and a carriage 20 which can travel on the track part 10 in the X-axis direction. As shown in FIG. 3, the road surface part 60 is mounted on a left side portion of a base frame 11 (hereinafter, abbreviated as "base 11") of the track part 10. On an upper surface of the road surface part 60, a road surface 63a on which the test tire T mounted on the carriage 20 contacts is provided. In the present embodiment, the road surface part 60 is removably attached to the base 11 of the track part 10 so that the road surface part 60 can be replaced according to test conditions. The base 11 of the track part 10 and a frame 61 of the road surface part 60 may be integrated by, for example, welding. Alternatively, the road surface part 60 may be installed directly on a foundation to completely separate the road surface part 60 from the track part 10.

[0020] As shown in FIG. 5, at a front end portion of the track part 10, a pair of wheel stoppers 13 are provided adjacent to drive parts 14LB and 14RB which will be described later. The wheel stoppers 13 are devices for forcibly stopping the carriage 20 by colliding with the carriage 20 when the carriage 20 overruns. Each wheel stopper 13 includes a pair of hydraulic shock absorbers 131 that mitigates shock generated at the time of collision with the carriage 20.

[0021] As shown in FIG. 4, a test wheel W (i.e., a wheel rim Wr to which the test tire T is mounted) is attached to the carriage 20. During the test, the carriage 20 travels with the test wheel W in contact with the road surface 63a, and the test wheel W rolls on the road surface 63a.

[0022] As shown in FIGS. 3 and 5, the track part 10 includes a plurality of (in the illustrated embodiment, three) guide mechanisms 12A, 12B, and 12C that guide the movement of the carriage 20 in the X-axis direction. The guide mechanisms 12A, 12B, and 12C are provided at a left end portion, a central portion in the width direction (i.e., in the Y-axis direction), and a

belts 151 (151L, 151R), three driven pulleys 155A, 155C, and 156 held by the first driven part 22 (FIG. 16) or three driven pulleys 155A, 155B, and 155C held by the second driven part 23 (FIG. 18), and a pair of belt clamps 157 (FIGS. 3 and 5) that fix opposite ends of the belt 151 to the main frame 21 of the carriage 20. The drive pulley part 150 is installed on a frame 14a of the corresponding drive part 14 and connected to the corresponding drive part 14 (FIG. 12). The drive pulley part 150 includes a tension adjusting part 16 that automatically adjusts tension of the belt 151.

[0055] The belt 151R is wound around the drive pulleys 152 (152A, 152B) of the pair of drive pulley parts 150 (150A, 150B) and the three driven pulleys 155A, 156, and 155C of the first driven part 22. The belt 151L is wound around the drive pulleys 152 (152A, 152B) of the pair of drive pulley parts 150 (150A, 150B) and the three driven pulleys 155A, 155B, and 155C of the second driven part 23.

[0056] As shown in FIGS. 12-14, The drive part 14 includes a pair of motors 141 (141A, 141B) (first motor) and a pair of belt mechanisms 142 (142A, 142B). The motor 141 is, for example, an ultra-low inertia, high output type AC servo motor whose inertia moment of a rotating part is 0.01 $kg \cdot m^2$ or less (more preferably, 0.008 $kg \cdot m^2$ or less) and a rated output of 3kW to 60kW (more practically, 7kW to 37kW). By using such ultra-low inertia, high output motor 141, the carriage 20 can be accelerated to a maximum speed of the test tire T (e.g., 240km/h) in a short travel distance (e.g., 20 to 50m).

[0057] The motor 141 may be a motor in which a rotating part has a normal inertia moment. The motor 141 may also be another type of electric motor of which speed can be controlled, such as a so-called inverter motor in which an inverter is used for drive control.

[0058] The pair of motors 141A and 141B are arranged in the front-rear direction (X-axis direction) with the shaft 141b oriented in left-right direction (Y-axis direction). The pair of motors 141A and 141B are disposed with the shaft 141b oriented in the opposite directions with respect to each other in the left-right direction. That is, the shaft 141b of one motor 141A projects to the left (Y-axis positive direction), and the shaft 141b of the other motor 141B projects to the right (Y-axis negative direction). The belt mechanism 142A that transmits the power of the motor 141A is disposed on the left side of the drive part 14, and the belt mechanism 142B that transmits the power of the motor 141B is disposed on the right side of the drive part 14.

[0059] The belt mechanism 142 includes a drive pulley 142a attached to a shaft 141b of the motor 141, a driven pulley 142c, and a belt 142b wound around the drive pulley 142a and the

actuator 166 (e.g., an air cylinder) that drives the other end portion of the arm 162 vertically.

[0065] The arm 162 is bent at two positions in the longitudinal direction in opposite directions to form a zigzag shape. At a bent portion on one end side, the arm 162 is bent at an angle of about 90 degrees to prevent interference with the belt 151, and at a bent portion on the other end side, the arm 162 is bent at an obtuse angle in accordance with movable ranges of the linear actuator 166 and the dancer roll 164.

[0066] A rear end portion and a center portion (i.e., the bent portion on the other end side) of the arm 162 are provided with pivots 162a and 162b extending on both sides in the Y-axis direction, respectively. The pivot 162a is rotatably supported by the bearing part 161. A tip portion of the arm 162 is provided with a bearing part 162c that rotatably supports a shaft 164a of the dancer roll 164.

[0067] The linear actuator 166 includes a main body 166a attached to the frame 14a of the drive part 14, a rod 166b protruding downward from the main body 166a, and a bearing 166c provided at a tip portion of the rod 166b. the bearing part166c forms a joint with a pivot 162b, and the joint couples the rod 166b and the arm 162 rotatably about the pivot 162b.

[0068] The operation of the linear actuator 166 is controlled by controlling air pressure supplied to the linear actuator 166 with an electromagnetic valve 166d (FIG. 36). The electromagnetic valve 166d is communicably connected to the controller 1070, and the operation of the electromagnetic valve 166d is controlled by the controller 1070. A proportional control valve such as an electropneumatic regulator capable of controlling pressure of a pressurized fluid such as compressed air supplied to the linear actuator 166 can be used as the electromagnetic valve 166d.

[0069] As the linear actuator 166 operates and the rod 166b moves forward and backward, the arm 162 connected to the rod 166b at the other end portion swings about the pivot 162a, and as a result, the dancer roll 164 held at one end portion of the arm 162 moves forward and backward toward the belt 151. When the rod 166b is made to protrude, the dancer roll 164 pushes the lower portion of the loop of the belt 151 inward, and the tension of the belt 151 increases. That is, the tension of the belt 151 can be adjusted in accordance with the operation amount of the linear actuator 166. Furthermore, by supplying the pressurized fluid of a constant pressure to the linear actuator 166 with the electro-pneumatic regulator, the tension of the belt 151 can be kept constant.

[0070] The second adjusting part 16B includes a frame 169 fixed to the frame 14a of the drive part 14, and a dancer roll 167 rotatably supported by the frame 169. As shown in FIG. 13, the

traveling speed, and the μ-S characteristic is obtained for a plurality of different traveling speeds. The following measurement and recording of the μ-S characteristics are performed by the controller 1070 executing a program stored in the storage device 1072 of the controller 1070 shown in FIG. 36 (or other storing means accessible by the controller 1070 such as a server 92 connected to the controller 1070 via a network such as a LAN, for example), and the measurement results and the like are stored in the storage device 1072 or other storing means.

[0201] The slip ratio S can be calculated by the following formula (1):

$$\text{Slip ratio } S = (\text{vehicle speed} - \text{wheel peripheral speed}) \div \text{vehicle speed} \times 100\% \quad (1)$$

The vehicle speed is the traveling speed of a vehicle (i.e., a moving speed of a center of gravity of the vehicle), and corresponds to the traveling speed of the carriage 20 in the flat-type tire testing device 1000 of the present embodiment. The wheel peripheral speed is a speed in a tangential direction on an outer peripheral surface of the wheel (i.e., a surface of the tread of the tire), and corresponds to a peripheral speed of the test wheel W in the flat-type tire testing device 1000 of the present embodiment.

[0202] When the slip ratio is 0%, the vehicle speed and the wheel peripheral speed are equal, the vehicle is traveling at a speed corresponding to a rotation speed of the wheel, and there is no slip, rotation loss, or the like. On the other hand, when the slip ratio is 100%, the wheel peripheral speed = 0, which represents a state where the vehicle travels while slipping (more precisely, the tire is slipping on the road surface) even though the wheel is completely locked (i.e., the rotation is stopped).

[0203] When measuring the μ-S characteristic with the flat-type tire testing device 1000 of the present embodiment, the μ-S characteristic can be measured with the following procedure.

[0204] First, a predetermined initialization process is performed to set the flat-type tire testing device 1000 to the initial state. As shown in FIG. 1, in the initial state, the carriage 20 is positioned at an initial position (initial traveling position) P_{X0} which is set near an end in the X-axis negative direction of its movable range. The elevating frame 421 (FIG. 20) is positioned at an initial position P_{Z0} which is set near, for example, an upper end of its movable range. At the initial position P_{Z0}, the test wheel W floats from the road surface 63a, so that the test wheel W can be attached and detached and the alignment can be adjusted. The camber angle adjusting part 44 and the slip angle adjusting part 46 adjust the camber angle and the slip angle to set values, respectively. Then, the traveling speed at which the μ-S characteristic is to be measured

2023b1 and 2023b2 of the road surface 2023b are formed by changing the particle size and amount of aggregates used. The first travel lane 2023b1 on the right side when facing the traveling direction is a simulated road surface simulating a smooth road surface such as an asphalt paved road surface, and the second travel lane 2023b2 on the left side is a simulated road surface simulating a rough road surface such as a stone pavement. The road surface conditions can be changed by switching the travel lanes 2023b1 and 2023b2 of the road surface 2023b on which to make the test tire T to contact. The switching of the travel lanes is performed by a later-described traverse mechanism 2011 (travel lane switching mechanism) of the tire holding part 2010.

[0226] The rotation drive part 2030 includes a motor 2032, and a power coupling part 2034 that couples power output from the motor 2032 to the power circulation circuit. The motor 2032 is, for example, an inverter motor of which driving is controlled by an inverter circuit 2032a (FIG. 41). A shaft 2032b of the motor 2032 is coupled to an input shaft 2034a of the power coupling part 2034. One end 2034b1 of the output shaft 2034b of the power coupling part 2034 is coupled to the shaft 2022a of the rotating drum 2022, and the other end 2034b2 of the output shaft 2034b is coupled to one end of the drive shaft 2062. The output shaft 2034b of the power coupling part 2034 constitutes a part of the power circulation circuit, and the shaft 2032b of the motor 2032 is coupled to the power circulation circuit via the power coupling part 2034. That is, the motor 2032 rotationally drives the power circulation circuit to control a rotation speed of the power circulation circuit.

[0227] The relay part 2040 includes a gear box 2042, a drive pulley 2044, a bearing part 2045 that rotatably supports a shaft of the drive pulley 2044, a tension pulley 2046 that applies a predetermined tension to the V belt 2066 wound around the drive pulley 2044, and a bearing part 2047 that rotatably supports a shaft of the tension pulley 2046.

[0228] The gear box 2042 includes a first gear 2042a coupled to the other end of the drive shaft 2062, and a second gear 2042b meshed with the first gear 2042a. The second gear 2042b is coupled to the shaft of the drive pulley 2044. In the present embodiment, since the number of teeth of the first gear 2042a is the same as the number of teeth of the second gear 2042b, the gear box 2042 converts rotation input from the drive shaft 2062 into rotation of the same speed in the opposite direction, and transmits the rotation to the drive pulley 2044.

[0229] The first gear 2042a and the second gear 2042b are replaceable with gears having different numbers of teeth (diameters). For example, the rotation speed may be increased or decreased by the gear box 2042 by providing a difference in the number of teeth between the

2014 as an alignment mechanism for the test tire T. The alignment mechanism is a mechanism capable of adjusting the alignment of the test tire T with respect to the road surface 2023b by changing a position or orientation of the spindle part 2015.

[0239] The traverse mechanism 2011 (travel lane switching mechanism) is a mechanism that moves a position of the test tire T in the axial direction by moving the base plate 2102 in the Y2-axis direction with respect to the base plate 2101 to switch the travel lanes 2023b1 and 2023b2 of the road surface 2023b with which the test tire T is in contact. The traverse mechanism 2011 includes a plurality of linear guides 2111 that guide the base plate 2102 in the axial direction of the rotating drum 2022 (Y2-axis direction) with respect to the base plate 2101, a servo motor 2112 that drives the base plate 2102, and a ball screw 2113 (feed screw mechanism) that converts rotational motion of the servo motor 2112 into linear motion in the Y2-axis direction. The ball screw 2113 includes a screw shaft 2113a and a nut 2113b.

[0240] Each linear guide 2111 includes a rail 2111a, and one or more carriages 2111b that can travel on the rail 2111a via not-shown rolling bodies. The rail 2111a of the linear guide 2111 is attached to an upper surface of the base plate 2101, and the carriage 2111b is attached to a lower surface of the base plate 2102. That is, the base plate 2101 and the base plate 2102 are connected slidably in the Y2-axis direction via the plurality of linear guides 2111.

[0241] The servo motor 2112 whose shaft is oriented in the Y2-axis direction is attached to the base plate 2101. The shaft of the servo motor 2112 is coupled to the screw shaft 2113a of the ball screw 2113, and the nut 2113b is attached to the lower surface of the base plate 2102. By driving the servo motor 2112, the base plate 2102 moves in the Y2-axis direction with respect to the base plate 2101. As a result, the position of the test tire T with respect to the rotating drum 2022 moves in the Y2-axis direction, and the travel lane 2023b1 or 2023b2 of the road surface 2023b with which the test tire T is in contact switches.

[0242] As shown in FIG. 41, the servo motor 2112 is connected to the controller 2070 via a servo amplifier 2112a. The switching operation of the travel lane with the servo motor 2112 is controlled by the controller 2070.

[0243] FIG. 45 is a rear view showing an upper portion of the tire holding part 2010. The camber angle adjusting mechanism 2012 is a mechanism that adjusts a camber angle of the test tire T by making the base plate 2103 pivot around the Z_2-axis with respect to the base plate 2102. The camber angle adjusting mechanism 2012 includes a vertically extending shaft 2121, a bearing 2122 that rotatably supports the shaft 2121, a curved guide 2123 that guides pivoting of the base plate 2103 about the shaft 2121, a servo motor 2124 attached to the base plate 2102

base plate 2103. The shaft of the servo motor 2132 is coupled to a screw shaft 2133a of the ball screw 2133, and the nut 2133b is attached to the base plate 2104. By driving the servo motor 2132, the base plate 2104 moves in the X_2-axis direction with respect to the base plate 2103 together with the nut 2133b. As a result, a distance between the axes of the rotating drum 2022 and the test tire T changes, and the load acting on the test tire T changes.

[0249] As shown in FIG. 41, the servo motor 2132 is connected to the controller 2070 via a servo amplifier 2132a. The load adjusting operation of the test tire T with the servo motor 2132 is controlled by the controller 2070.

[0250] The slip angle adjusting mechanism 2014 is a mechanism that adjusts a slip angle of the test tire T by rotating the spindle part 2015 about the X_2-axis with respect to the base plate 2104 to tilt the rotation axis of the test tire T about the X_2-axis with respect to the rotation axis of the rotating drum 2022.

[0251] The slip angle adjusting mechanism 2014 includes a shaft 2141 having one end fixed to a spindle case 2154 (bearing part) of the spindle part 2015 and extending in the Y_2-axis direction, a bearing part 2142 that supports the shaft 2141 rotatably about the X_2-axis (i.e., around an axis perpendicular to the contact surface), a servo motor 2143, and a ball screw 2144 (feed screw mechanism). The bearing part 2142 includes a rotary encoder 2142a (FIG. 41) that detects angular position of the shaft 2141 (i.e., the slip angle of the test tire T). A center line (rotation axis) of the shaft 2141 passes through the approximate center of a wheel part 2156 and is disposed perpendicular to a rotation axis of the wheel part 2156. The servo motor 2143 is attached to the base plate 2104 via a hinge 2143b pivotable about the Y_2-axis with a shaft oriented approximately in the Z_2-axis direction. The shaft of the servo motor 2143 is coupled to a screw shaft 2144a of the ball screw 2144. A nut 2144b of the ball screw 2144 is attached to one end portion of the spindle case 2154 in the X_2-axis direction (a portion away from a center of the shaft 2141 in the X_2-axis direction) via a hinge 2146 pivotable about the Y_2-axis.

[0252] By driving the servo motor 2143 to move the nut 2144b of the ball screw 2144 up and down, the spindle case 2154 rotates together with the shaft 2141. As a result, the slip angle of the test tire T held by the spindle part 2015 changes.

[0253] As shown in FIG. 41, the servo motor 2143 is connected to the controller 2070 via a servo amplifier 2143a. The slip angle adjusting operation with the servo motor 2143 is controlled by the controller 2070.

[0254] The spindle part 2015 includes the spindle 2152, the spindle case 2154 (bearing part) that rotatably supports the spindle 2152, and the wheel part 2156 coaxially attached to one end

with the peripheral speed of the rotating drum 2022, and a non-negligible amount of torque may be generated due to the speed difference between the two. In such a case, for example, by setting a target value of the torque of the test wheel W to 0N·m and controlling the torque of the servo motor 2052 of the torque generating part 2050, the slip ratio can be made approximately 0%.

[0267] The torque generating part 2050 applies a set torque to the test tire T. While the rotating drum 2022 is rotating at the set peripheral speed (traveling speed), the torque acting on the test tire T and the three component forces acting on the test tire T are detected by the torque sensor 2152a and the three component force sensor 2152b at predetermined time intervals (e.g., at intervals of 5 milliseconds). The time intervals between the detections by the torque sensor 2152a and the three component force sensor 2152b are appropriately set in accordance with test conditions (e.g., the set value of the traveling speed, required test accuracy, and the like).

[0268] The torque to be applied to the test tire T by the torque generating part 2050 is controlled so that a predetermined torque is applied while the rotating drum 2022 is rotating at the set peripheral speed (traveling speed). For example, while causing the rotating drum 2022 to travel at a constant speed (constant-speed rotation) at the set peripheral speed (traveling speed), control is performed so that the test starts in a state where the torque is nearly equal to 0N·m, that is, the vehicle speed is nearly equal to the wheel peripheral speed and the slip ratio S is nearly equal to 0%, the torque is gradually increased, and after an elapse of a predetermined time, a torque that causes the test wheel W to be completely locked (i.e., the wheel peripheral speed to be 0km/h, and the slip ratio S to be 100%) is applied.

[0269] As described above, while gradually increasing the torque so that the slip ratio S changes from 0% to 100%, the measured values by the various sensors provided in the drum-type tire testing device 2000 of the present embodiment are recorded at predetermined time intervals (e.g., at intervals of 5 milliseconds). The traveling speed of the rotating drum 2022 (the peripheral speed of the outer peripheral surface of the rotating drum 2022) is calculated from the detection result of the rotary encoder 2241, and the traveling speed of the test tire T is calculated from the detection result of the rotary encoder 2154b. As a result, values of the braking force coefficient μ and the slip ratio S at the respective measurement timings are measured at predetermined time intervals, and the μ-S characteristic at the initially set traveling speed (e.g., 5km/h) is measured.

[0270] It should be noted that, for example, when performing the test with both the flat-type tire testing device 1000 and the drum-type tire testing device 2000 for the same traveling speed (vehicle speed), it is desirable that the measurement is performed while setting a time (test time) required to change the slip ratio S from 0% to 100% to the same as the test time set in the flat-

testing device 2000 at each measurement speed Vw within the characteristic estimation range, thereby generating a synthesized μ-S characteristic in the entire range (step S15).

[0304] In general, since the flat-type tire testing device 1000 having a flat road surface can perform measurement in a state closer to a traveling state on an actual road surface, the first μ-S characteristic measured by using the flat-type tire testing device 1000 is used as it is at each measurement speed Vw within the characteristic comparison range, and the second μ-S characteristic measured by using the drum-type tire testing device 2000 is converted to obtain the corrected μ-S characteristic corresponding to the first μ-S characteristic by the flat-type tire testing device 1000 at each measurement speed Vs within the characteristic estimation range, and these μ-S characteristics (that is, the first μ-S characteristic within the characteristic comparison range and the corrected μ-S characteristic within the characteristic estimation range) are connected to generate a synthesized μ-S characteristic (also referred to as "extended μ-S characteristic") corresponding to a measurement result when the entire range is measured on a flat road surface.

[0305] In the above description, the method for obtaining the conversion relation (i.e., conversion coefficient) between the second μ-S characteristic by the drum-type tire testing device 2000 and the first μ-S characteristic by the flat-type tire testing device 1000 by comparing the actual measured values has been described. However, the present invention is not limited to this configuration. For example, the conversion method may be set in advance. In this case, for example, the first μ-S characteristic measured by the flat-type tire testing device 1000 may be used in the relatively low speed range (low speed range), the second μ-S characteristic measured by the drum-type tire testing device 2000 may be converted by a predetermined conversion method in the relatively high speed range (high speed range) to obtain the corrected μ-S characteristic, and the first μ-S characteristic in the low speed range and the corrected μ-S characteristic in the high speed range may be connected. In this case, for example, a conversion method based on the curvature correction of the road surface can be adopted based on the difference in structure between the flat-type tire testing device 1000 and the drum-type tire testing device 2000 (specifically, the presence or absence of the curvature of the road surface). Furthermore, when comparing the first μ-S characteristic and the second μ-S characteristic in the above-described characteristic comparison range and estimating the conversion formula, it is also possible to perform estimation based on a more detailed conversion formula, for example, by using a formula based on the curvature correction.

[0306] In the description of the present embodiment, an example of the measurement of the μ-

CLAIMS

1. A tire testing method including:

a first measurement step of measuring a first μ-S characteristic of a test tire using a first tire testing device that rotatably holds a test wheel on which the test tire is mounted and causes the test tire to travel along a flat first road surface in a state where the test tire is made to contact the first road surface;

a second measurement step of measuring a second μ-S characteristic of the test tire using a second tire testing device that causes the test tire to rotate in a state where the test tire is made to contact a second road surface provided on an outer periphery of a rotating drum;

a comparing step of comparing the first μ-S characteristic and the second μ-S characteristic and obtaining a relationship between the two μ-S characteristics;

a characteristic converting step of converting the second μ-S characteristic into a corrected μ-S characteristic corresponding to the first μ-S characteristic based on the relationship between the two μ-S characteristics obtained in the comparing step; and

a characteristic synthesizing step of synthesizing the first μ-S characteristic measured in the first measurement step and the corrected μ-S characteristic obtained in the characteristic converting step to obtain a synthesized μ-S characteristic of the test tire.

2. The tire testing method according to claim 1, wherein:

the comparing step is performed for a first range of a measurement speed within which the first μ-S characteristic is measured,

the characteristic converting step is performed, based on a comparison result in the comparing step, for a second range of the measurement speed within which the first μ-S characteristic is not measured, and

in the characteristic synthesizing step, the synthesized μ-S characteristic obtained by synthesizing the first μ-S characteristic measured for the first range and the corrected μ-S characteristic obtained for the second range.

3. The tire testing method according to claim 1 or 2, wherein:

each of the first tire testing device and the second tire testing device includes a torque generating part that generates torque to be applied to the test tire, and

in each of the first measurement step and the second measurement step, measurement is performed at a plurality of measurement speeds, and when measuring the first and second μ-S characteristics at each measurement speed, a slip ratio S is changed by applying torque to the test tire with the torque generating part.

4. The tire testing method according to any one of claims 1 to 3, wherein, in the characteristic converting step, the second μ-S characteristic is converted into the corrected μ-S characteristic by multiplying the second μ-S characteristic by a conversion coefficient obtained in the comparing step.

5. The tire testing method according to any one of claims 1 to 3, wherein, in the characteristic converting step, the second μ-S characteristic is converted into the corrected μ-S characteristic by multiplying the second μ-S characteristic by a conversion coefficient corresponding to the measurement speed which is obtained in the comparing step.

6. The tire testing method according to any one of claims 1 to 3, wherein, in the characteristic converting step, the second μ-S characteristic is converted into the μ-S characteristic of the test tire obtained from the first tire testing device by multiplying the second μ-S characteristic by a conversion coefficient corresponding to the measurement speed and the slip ratio which is obtained in the comparing step.

7. The tire testing method according to any one of claims 1 to 6, wherein, in the first measurement step and the second measurement step, the first or second μ-S characteristic is measured while applying a driving force to the test tire.

8. A tire testing method including a wear test performing step of performing a wear test on the test tire,

wherein, after performing the wear test for a predetermined time period, the tire testing method according to any one of claims 1 to 7 is performed to obtain the μ-S characteristic of the test tire.

9. A tire testing device comprising:

a first tire testing device including a carriage that rotatably holds a test wheel to which

a test tire is mounted and is capable of traveling along a flat first road surface in a state where the test tire is made to contact the first road surface;

a second tire testing device including a rotating drum having a second road surface provided on an outer periphery thereof, a tire holding part that rotatably holds the test tire in a state where the test tire is made to contact the second road surface, and a drive part that rotates the rotating drum and the tire holding part; and

a controller that compares a first μ-S characteristic of the test tire measured by the first tire testing device with a second μ-S characteristic of the test tire measured by the second tire testing device to obtain a relationship between the two μ-S characteristics, converts the second μ-S characteristic into a corrected μ-S characteristic corresponding to the first μ-S characteristic based on the relationship between the two μ-S characteristics, and synthesizes the first μ-S characteristic and the corrected μ-S characteristic to obtain a synthesized μ-S characteristic.

10. The tire testing device according to claim 9, wherein:

each of the first tire testing device and the second tire testing device includes a torque generating part that generates torque to be applied to the test tire, and

each of the first μ-S characteristic and the second μ-S characteristic is measured at a plurality of measurement speeds, and when measuring the first and second μ-S characteristics at each measurement speed, the slip ratio S is changed by applying torque to the test tire with the torque generating part.

11. The tire testing device according to claim 9 or 10, further comprising wear testing means configured to perform a wear test on the test tire,

wherein, after the wear test is performed by the wear testing means, the μ-S characteristic of the test tire after the wear test is obtained.

12. The tire testing device according to claim 11, wherein:

the wear testing means is realized by changing gears by a gear box provided in the second tire testing device, and

after performing the wear test for a predetermined time period by changing gears by the gear box provided in the second tire testing device, the μ-S characteristic of the test tire is obtained by changing gears by the gear box.

13. A tire testing device comprising:

a first input part to which a measurement result of a μ-S characteristic by a first tire testing device is to be input, the first tire testing device comprising a road surface part having a first road surface, and a carriage that rotatably holds a test wheel to which a test tire is mounted and travelable along the first road surface in a state where the test tire is made to contact the first road surface;

a second input part to which a measurement result of a μ-S characteristic by a second tire testing device is to be input, the second tire testing device comprising a rotating drum provided with a second road surface on an outer periphery thereof, a tire holding part that rotatably holds a test tire in contact with the second road surface, and a drive part that rotates the rotating drum and the tire holding part; and

a controller configured to compare the μ-S characteristic of the test tire measured by the first tire testing device input through the first input part with the μ-S characteristic of the test tire measured by the second tire testing device input through the second input part to obtain a relationship between the two μ-S characteristics, convert the μ-S characteristic of the test tire measured by the second tire testing device input through the second input part into the μ-S characteristic of the test tire by the first tire testing device based on the obtained relationship between the two μ-S characteristics, and combine the μ-S characteristic of the test tire measured by the first tire testing device input through the first input part and the μ-S characteristic of the test tire by the first tire testing device obtained by the conversion to obtain the μ-S characteristic of the test tire.

14. A tire testing method including:

a first reading step of reading a μ-S characteristic of a test tire measured by a first tire testing device that rotatably holds the test wheel to which the test tire is mounted and causes the test tire to travel along a first road surface in a state where the test tire is made to contact the first road surface;

a second reading step of reading the μ-S characteristic of the test tire measured by a second tire testing device that rotates the test tire in a state where the test tire is made to contact a second road surface provided to an outer periphery of a rotating drum;

a comparing step of comparing the μ-S characteristic of the test tire measured by the first tire testing device read in the first reading step with the μ-S characteristic of the test tire measured by the second tire testing device read in the second reading step and obtaining a

relationship between the two μ-S characteristics;

a characteristic converting step of converting the μ-S characteristic of the test tire measured by the second tire testing device read in the second reading step to the μ-S characteristic of the test tire by the first tire testing device based on the relationship between the two μ-S characteristics obtained in the comparing step; and

a characteristic synthesizing step of synthesizing the μ-S characteristic of the test tire measured by the first tire testing device read in the first reading step and the μ-S characteristic of the test tire by the first tire testing device obtained by the conversion in the characteristic converting step to obtain a synthesized μ-S characteristic of the test tire.

15. A program for causing a computer to execute:

A first reading step of reading a μ-S characteristic of a test tire measured by a first tire testing device that rotatably holds the test wheel to which the test tire is mounted and causes the test tire to travel along a first road surface in a state where the test tire is made to contact the first road surface;

A second reading step of reading the μ-S characteristic of the test tire measured by a second tire testing device that rotates the test tire in a state where the test tire is made to contact a second road surface provided to an outer periphery of a rotating drum;

a comparing step of comparing the μ-S characteristic of the test tire measured by the first tire testing device read in the first reading step with the μ-S characteristic of the test tire measured by the second tire testing device read in the second reading step and obtaining a relationship between the two μ-S characteristics;

a characteristic converting step of converting the μ-S characteristic of the test tire measured by the second tire testing device read in the second reading step to the μ-S characteristic of the test tire by the first tire testing device based on the relationship between the two μ-S characteristics obtained in the comparing step; and

a characteristic synthesizing step of synthesizing the μ-S characteristic of the test tire measured by the first tire testing device read in the first reading step and the μ-S characteristic of the test tire by the first tire testing device obtained by the conversion in the characteristic converting step to obtain a synthesized μ-S characteristic of the test tire.