

問1

1. A board warp analyzing method for a system of analyzing a board warp in a multilayered structure layered in a first direction, the method comprising:
a step of, when a layer that extends along a second direction intersecting with the first direction includes a first material layer and a second material layer having different physicality from each other, using a dividing unit to virtually divide model data into a plurality of divided parts in the first direction along a boundary portion between the first material layer and the second material layer;
a step of using a calculation unit to calculate warps in the respective divided parts according to a multilayer beam theory and to virtually deform the divided parts based on the corresponding calculated warps; and
a step of using a combination-transformation unit to virtually combine the deformed divided parts to form a board and to calculate a wrap of the board as a whole based on the wraps in the divided parts.

2. The board warp analyzing method according to claim 1, wherein
the dividing unit virtually divides the model data representing a shape of the board into the plurality of divided parts in the second direction at the boundary portion between the first material layer and the second material layer, when a height of the first material layer as a length of the layer in the first direction is uneven.

問2

2. Description of the Related Art

[0002]

Conventionally, an air spoiler is attached to a rear end of a trunk lid or a back door to rectify an air flow around a vehicle body while traveling, in order to realize stabilization of the vehicle body and reduction of fuel consumption (see Japanese Unexamined Utility Model Application Publication No. S58-30578, for example).

[0003]

However, as being attached to a highly visible portion on an outer surface of a vehicle body, this air spoiler poses such a problem that it seriously spoils an external appearance of an automobile. In addition, as a rear skirt is provided for a back of the vehicle body in a curved manner from its bottom to rear end, a bottom flow under the vehicle body flows toward above the back of the vehicle body to join an upper flow that flows along a roof and the air spoiler toward the back of the vehicle body at a relatively high position. This adversely generates a turbulent flow over substantially an entire surface of the back of the vehicle body from a rear window to the rear skirt surrounded by the upper flow and the bottom flow. Therefore, the surface of the back of the vehicle body is highly susceptible to dirt as compared to other surfaces of the vehicle body, and easily becomes dirty.

問3

[0014]

The stage 7 is rotatable centering the shaft 8b by the motor 8a disposed within the base table 8, and is movable in a vertical direction Z along with the shaft 8b by the transmission mechanism 8d configured to convert a rotating movement of another motor 8c disposed within the base table 8 into a vertical reciprocating movement. The controller 9 drives the motors 7a, 8a, and 8c and monitors control signals of the motors, and controls and moves the suctioning hand 4 to a desired position.

[0015]

The glass substrate 5 is fixed on the hand main body 14 by operating the vacuum chuck 24 disposed on an upper surface of the hand main body 14, and this prevents the glass substrate 5 from falling or being displaced due to the movement of the suctioning hand 4 such as rotation. At a tip end of the hand main body 14, the slide stopper 84 having the projection 84a made of resin is provided. When retracting the suctioning hand 4 advanced into the transfer cartridge 6, the slide stopper 84 hooks on an edge of the glass substrate 5 on a back side above the suctioning hand 4, and reliably pulls the glass substrate 5 out of the transfer cartridge 6.