CUSTOMIZED SNOWBOARD TECHNIQUE

BACKGROUND AND GOALS

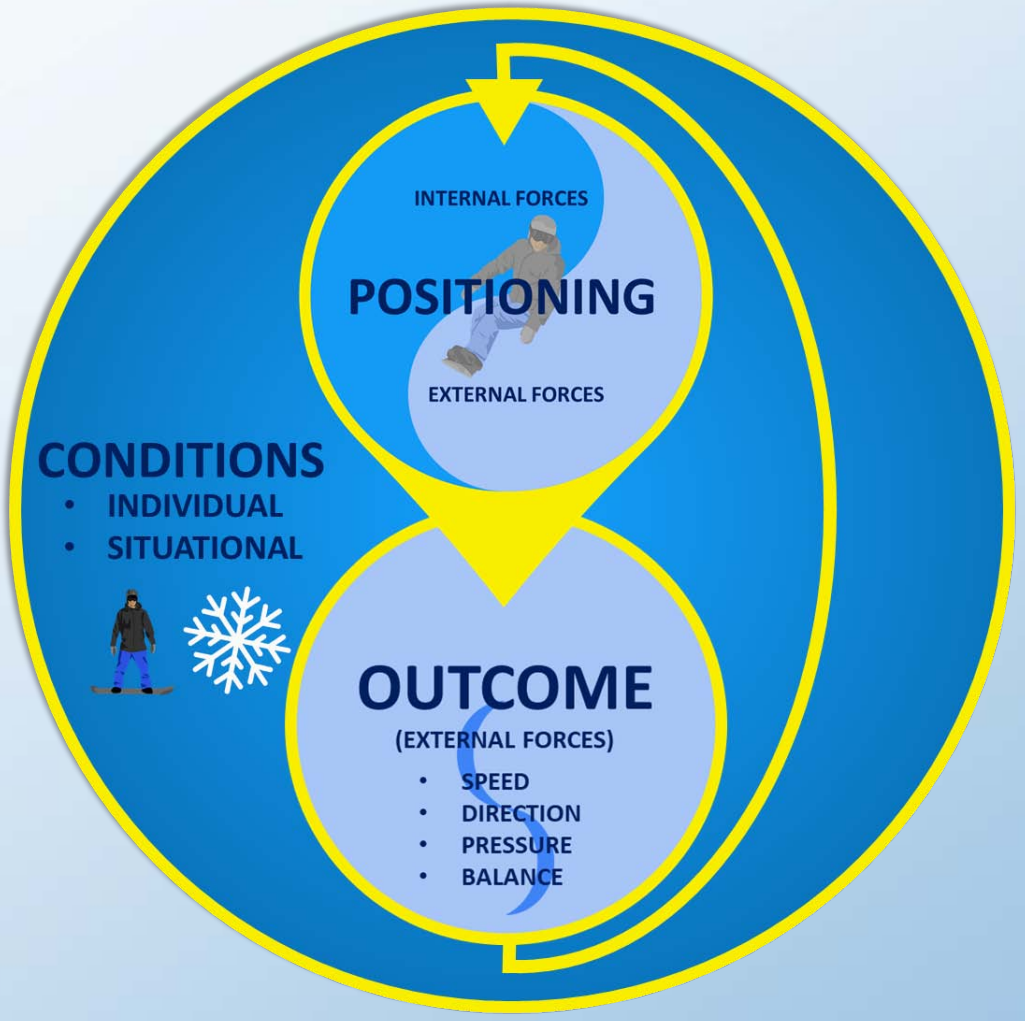
The content of our presentation is a part of the material that we have created for the Swedish snowboard instructor courses. It is the result of an ongoing project that began 8 years ago. Our ambition has been to create understanding about snowboard technique and to provide instructors with the tools to enable them to create a learning environment adapted to both the individual and the situation.
Based on this ambition, we have developed a model that we call “Customized snowboard technique”.

The two goals of the presentation is to show how we:

- Create understanding of snowboarding technique for our instructors
- Create an understanding of how the technique is adapted to the individual and to the situation

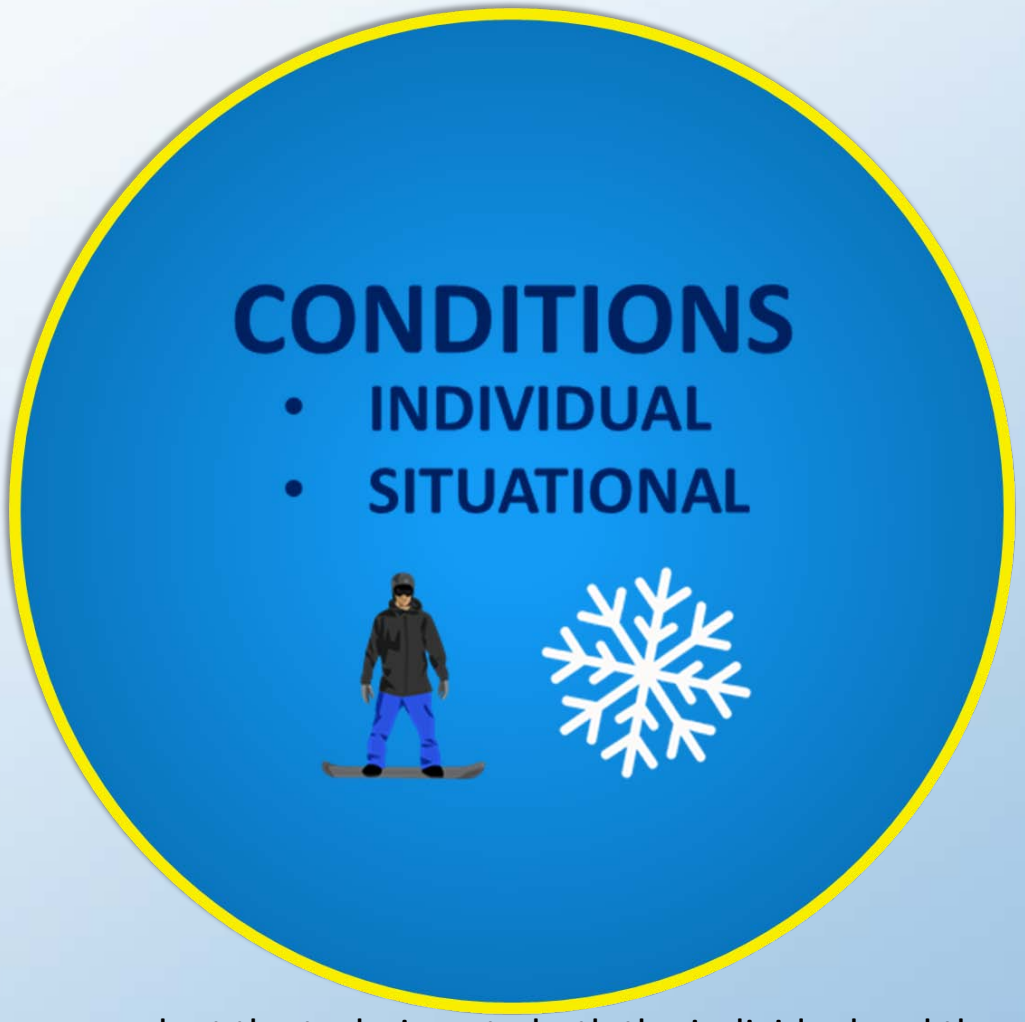
Customized Snowboard Technique

THE MODEL



The model provides a framework that incorporates the tools and concepts that we use to describe and analyze snowboard technique. The model has three parts; *conditions*, *outcome* and *positioning.*

CONDITIONS



Conditions describes how we adapt the technique to both the individual and the situation. This includes the individual's physical and psychological abilities as well as the physical characteristics of the situation, such as snow conditions, equipment and terrain.

CONDITIONS

Individual

Physical

- Physical status
- Motor skills
- Physical development (age, maturity)

Psychological

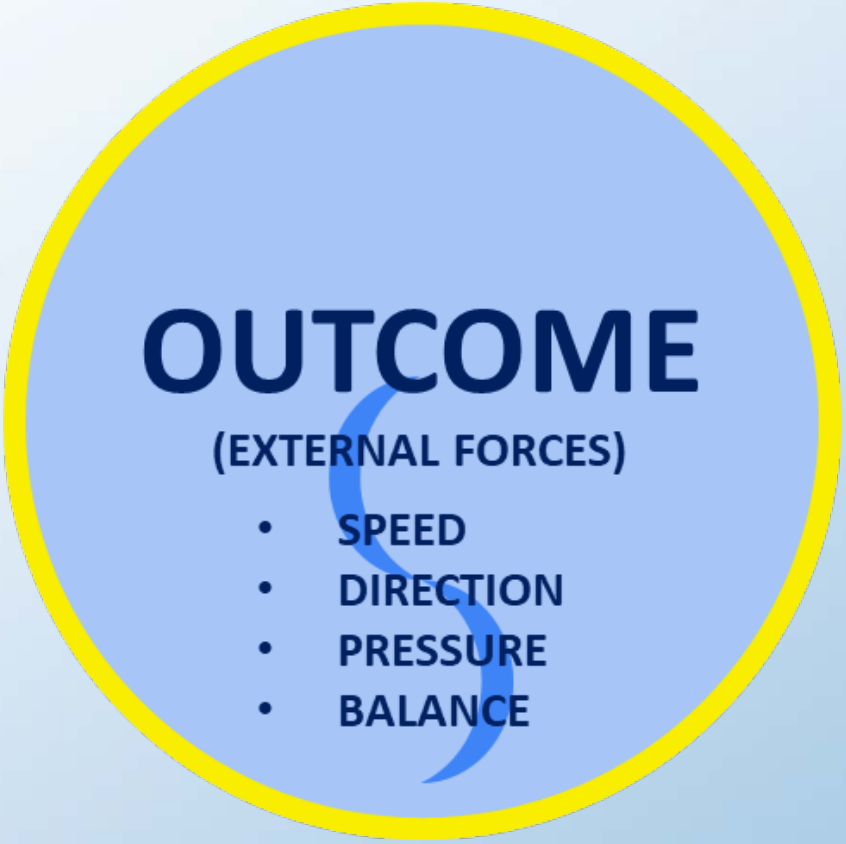
- Fear
- Confidence
- Ambition

CONDITIONS

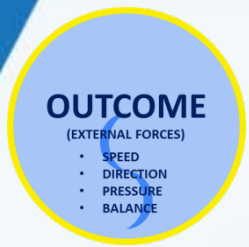
Situational

- Equipment (board, bindings, boots)
- Terrain (steepness etc.)
- Snow conditions
- Visibility
- Weather

OUTCOME

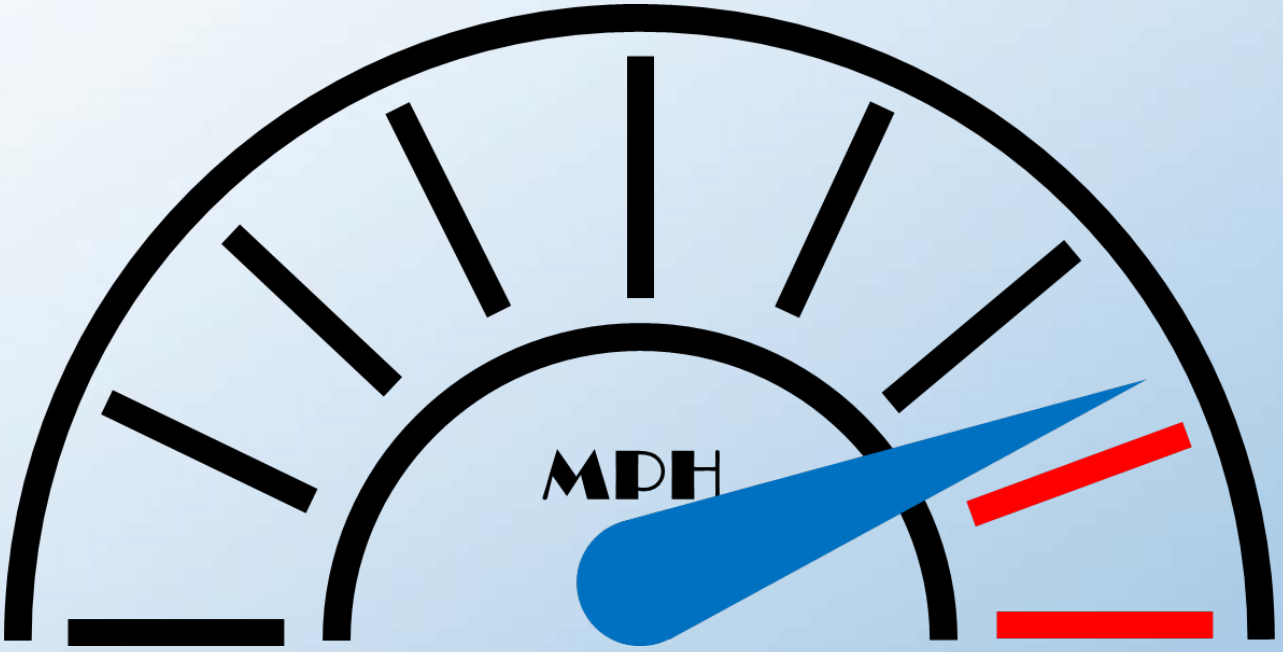


Outcome can be described as the “result” in snowboarding. It centers on motion - our decent down the mountain, which is regulated by external forces. Motion has two components: it has a certain speed and a certain direction. In addition to regulating our speed and direction, we have to control the total magnitude of the resulting forces, and how we balance the resulting forces that affect us. From this reasoning, we divide *Outcome* into four fundamental components: *Speed, Direction, Pressure, Balance*.

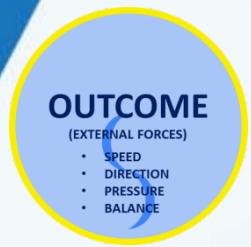


OUTCOME

Speed

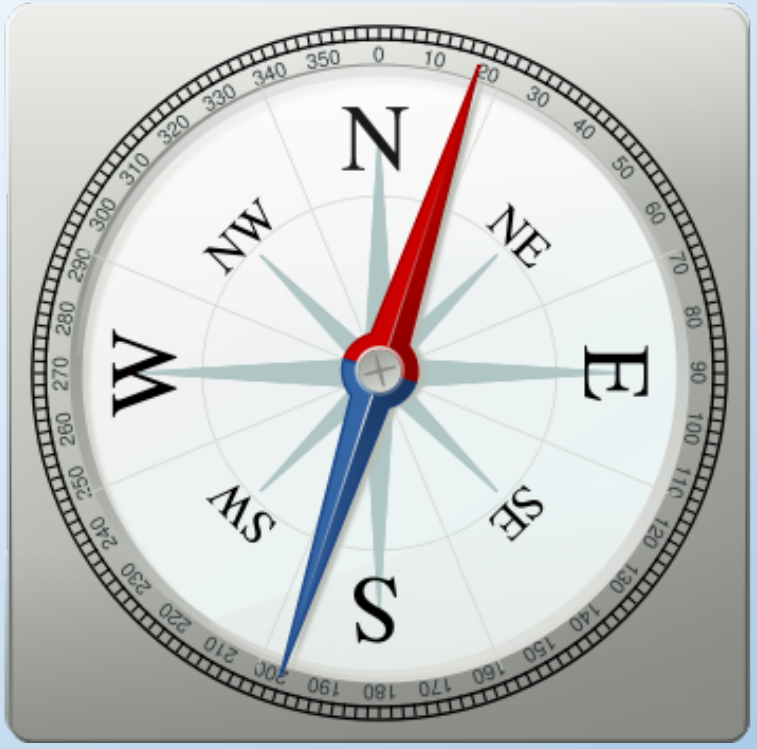


From a mechanics perspective, an object in motion has a momentum. This momentum is a product of the object's weight * speed. In snowboarding technique, we talk about speed because the weight of the rider can be considered constant. All snowboarders can relate to and understand that we must control the speed in one way or another when snowboarding.

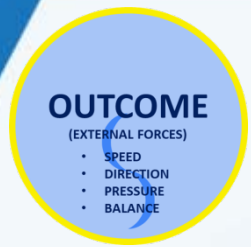


OUTCOME

Direction



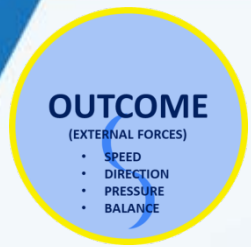
A snowboarder in motion moves in a certain direction. To change this direction, an external force is required to affect the rider. In addition to steering where we want to go, we control the speed with the direction, depending on our relationship with the fall line.



OUTCOME

Pressure

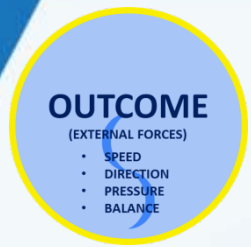
Pressure is the total amount of force the resulting forces impose on us. All movements we make affect the size of the resulting forces (pressure) if we are in contact with the snow. Speed and the size of the turn affects the pressure. At high speed we can be exposed to great forces.



OUTCOME

Balance

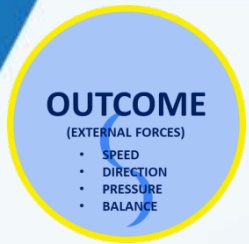
A prerequisite for us to be able to control our motion down the mountain is that we are in balance. We are in balance when the resulting forces from the snow hit the center of mass. We divide balance into two types: *static balance* and *dynamic balance*



OUTCOME

Balance (static)

Static balance means that the center of mass is inside the base of support. When the rider stands with the snowboard on a flat surface, the rider is in static balance.



OUTCOME

Balance (dynamic)

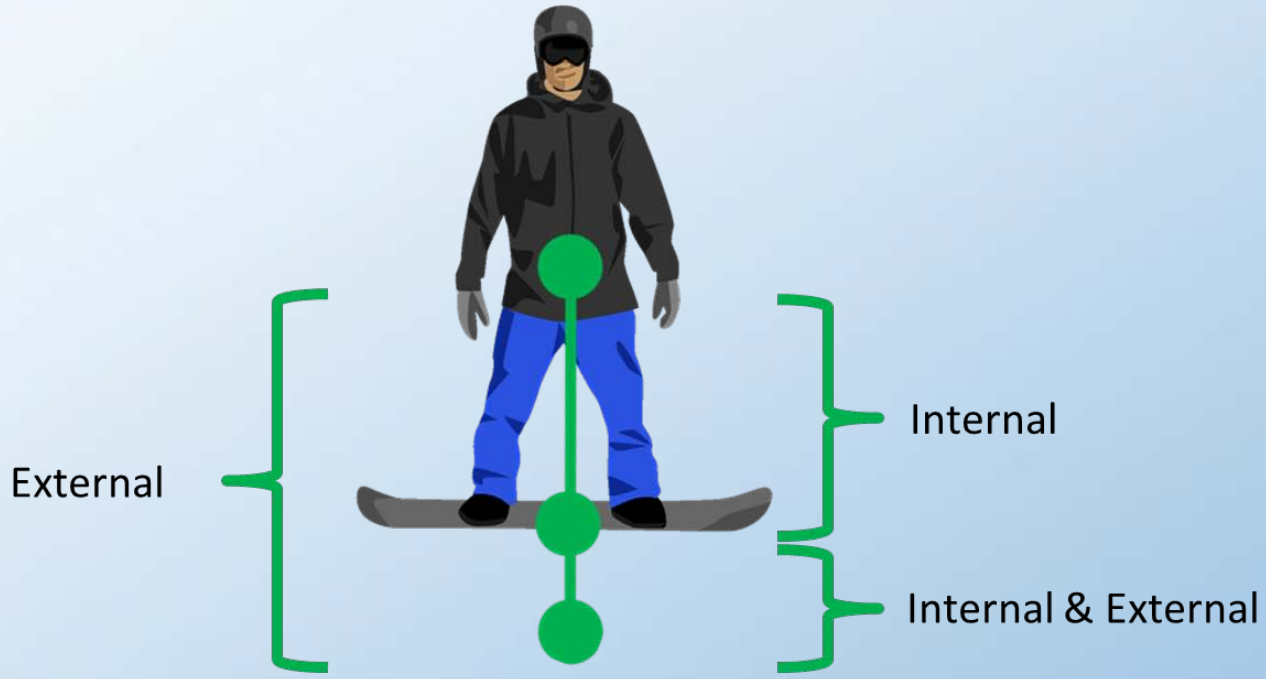
Dynamic balance means that the CM is outside the base of support. For example, in a turn, the resulting forces (turning forces) balance the rider.

POSITIONING

Positioning is about how we regulate the relationship between the center of mass, the snowboard and the resulting forces from the snow. This relationship is regulated through the interaction between internal and external forces.

POSITIONING

The relationship between three components:



The relationship between:

- CM and the snowboard is regulated by internal forces
- CM and the snow is regulated by external forces
- The snowboard and the snow can be regulated both with internal and external forces

POSITIONING

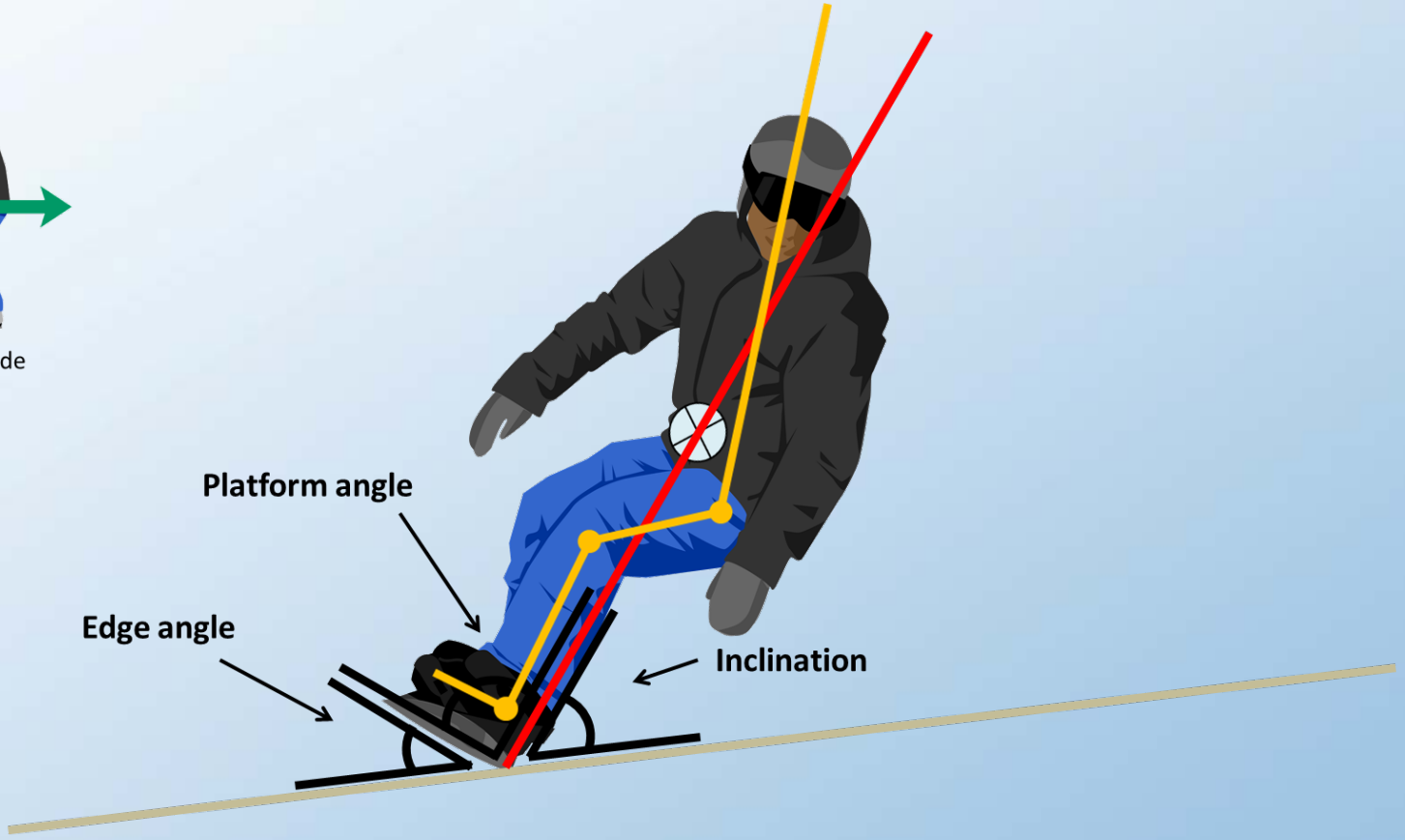
Positioning from four perspectives

1. Side-side
2. Up-down
3. For-aft
4. Rotations

The relationship between CM, the snowboard and snow can be regulated in a three-dimensional perspective, making it all complex. To simplify, we describe and analyze this relationship from four perspectives: Side-side, Up-down, For-aft and Rotations

POSITIONING

1. Side-side

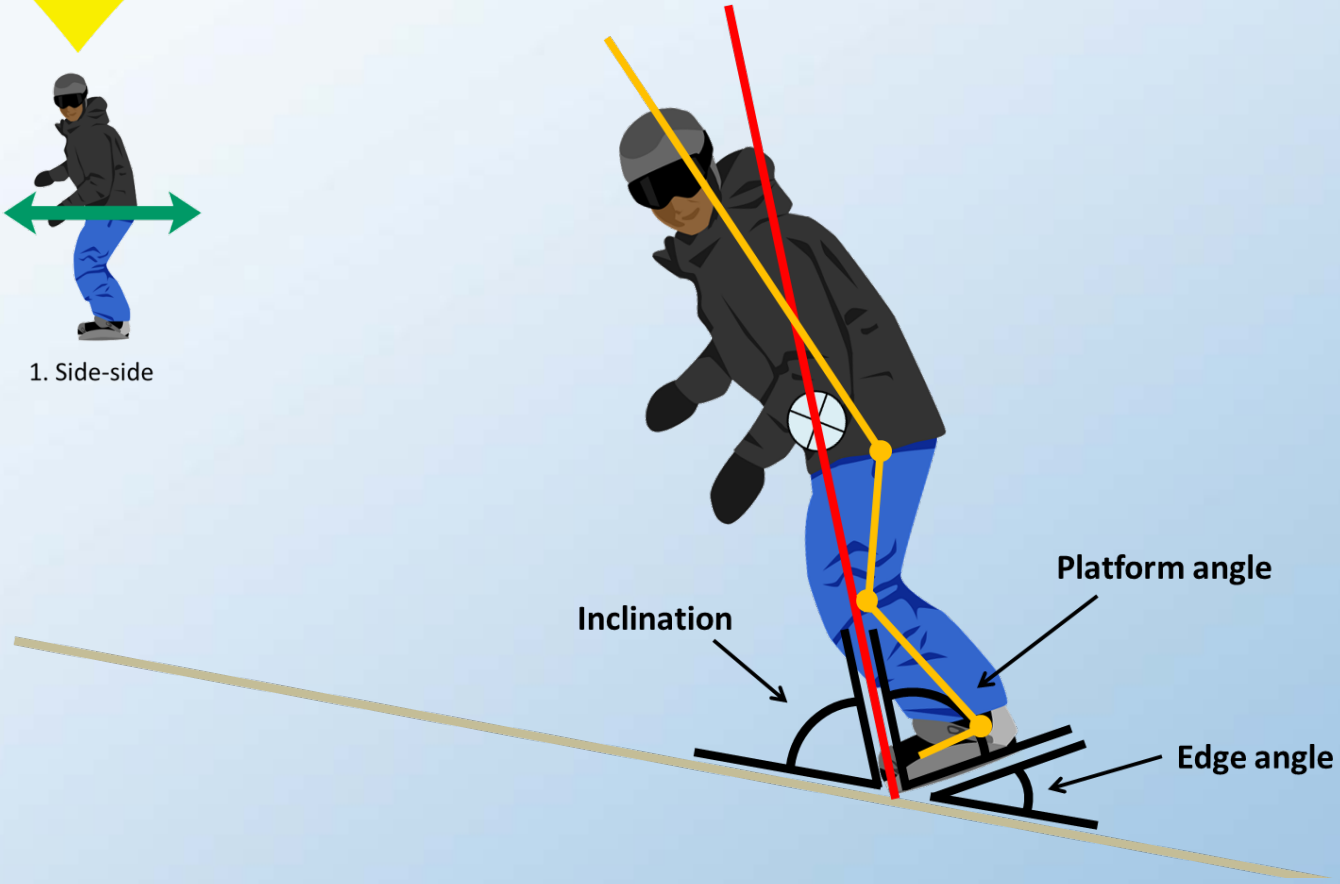


The relationship between the CM, snowboard and the snow (side-side) can be described with three angles: edge angle, platform angle and inclination (inclination angle). This relationship is regulated through the interaction between internal and external forces.

Customized Snowboard Technique

POSITIONING

1. Side-side (toe edge)



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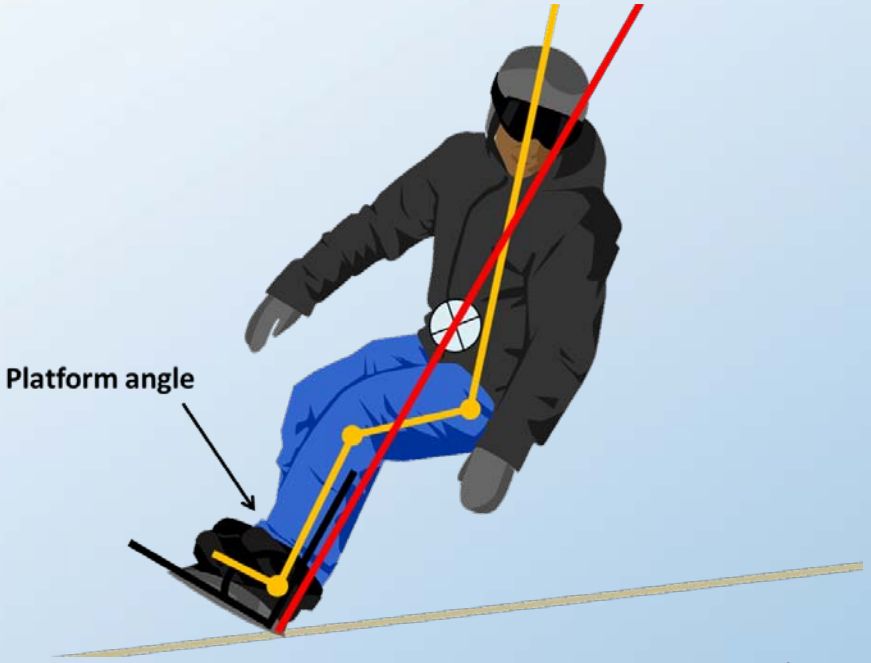
1. Side-side

POSITIONING

1. Side-side

Platform angle (center of mass/snowboard)



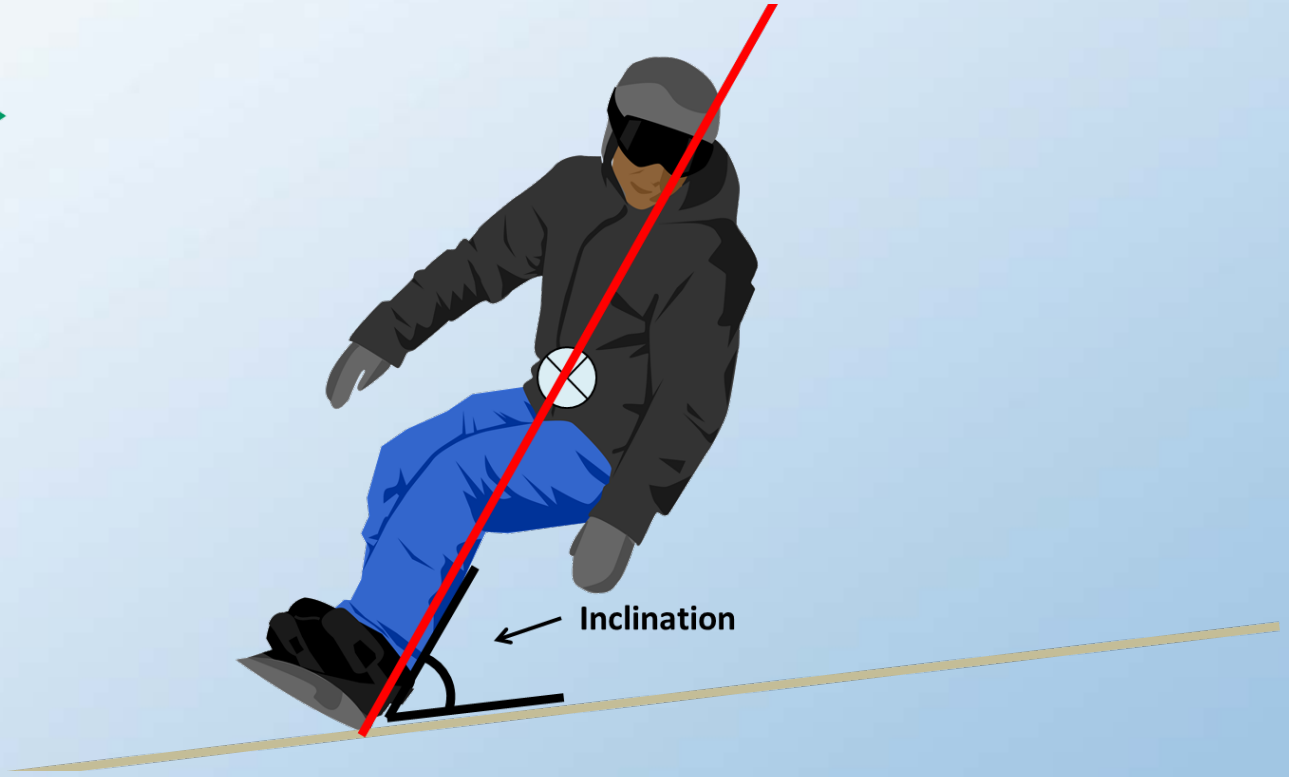
Platform angle is the angle between the balance axis and the snowboard (side-side) (CM/ snowboard). The platform angle controls the resistance between the snowboard and the snowboard sideways, ie. how well the snowboard grips or if it skids. This is the difference between carving or skidding. If the platform angle is less than 90 °, the snowboard can hold the edge by not slipping off the platform. If the angle is greater than 90 °, the snowboard slides off the platform and the snowboard will skid. The size of the platform angle is controlled by internal forces.

POSITIONING

1. Side-side

Inclination (center of mass/snow)

1. Side-side



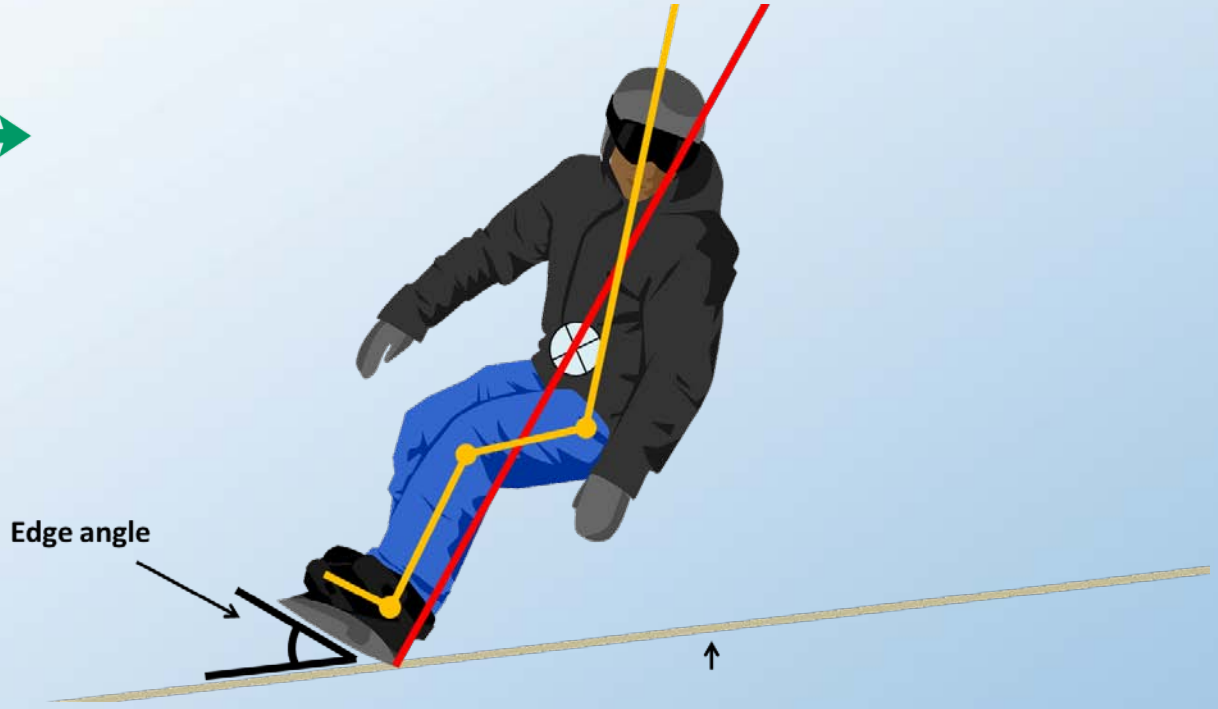
Inclination is the relationship between the CM and the resulting forces from the snow (side-side). The inclination is directly related to dynamic balance and is dependent on the speed and the size of the turn. Inclination is regulated by external forces.

POSITIONING

1. Side-side

Edge angle (Snowboard/snow)

1. Side-side



The edge angle is the angle between the snowboard and the snow (side-side). It controls how much you can bend through the sidecut of the snowboard to create a reverse camber. The reverse camber creates a steering angle in the frontal plane. This is what gives the snowboard its self-turning characteristics, in both skidded and carved turnes. The edge angle size can be regulated both with internal forces and external forces.

Customized Snowboard Technique

POSITIONING

1. Side-side

Peddling

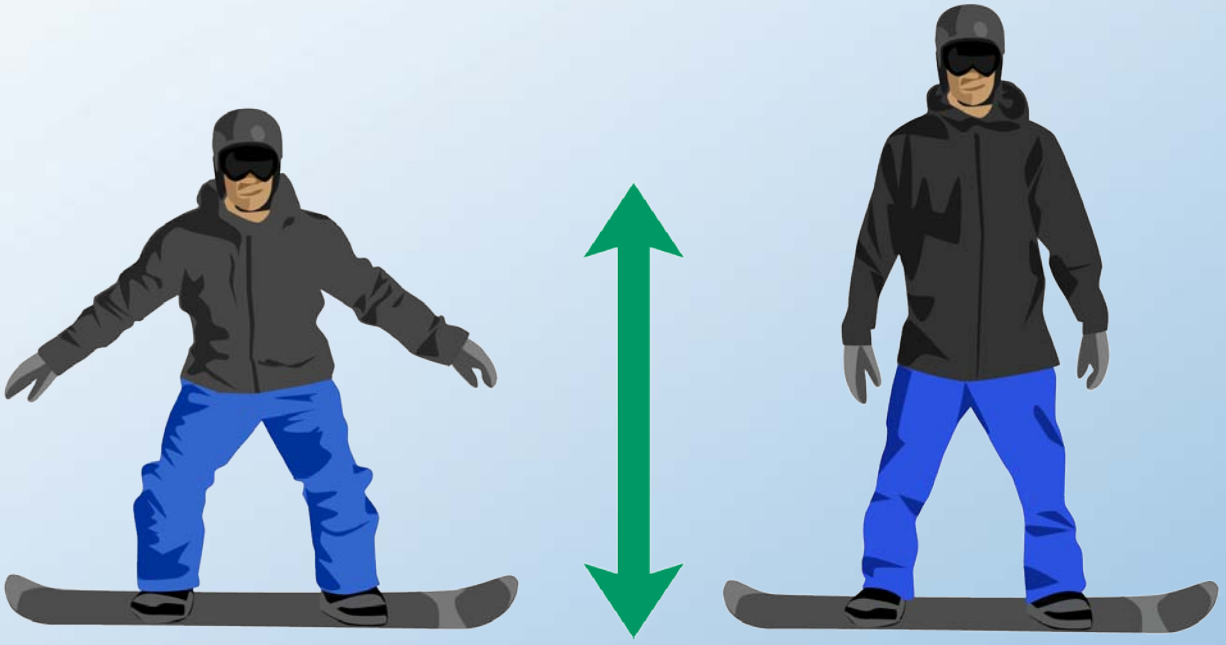
1. Side-side

Peddling involves a twist of the snowboard along the length of the board, which causes a decrease of the platform angle at one end of the snowboard and an increase of the platform angle at the other. This causes a rotation of the snowboard seen in the horizontal plane. The rotation occurs because the resistance is smaller where the platform angle is larger. Peddling can be used as a method to create a steering angle in the horizontal plane.

POSITIONING

2. Up-down

2. Up-down



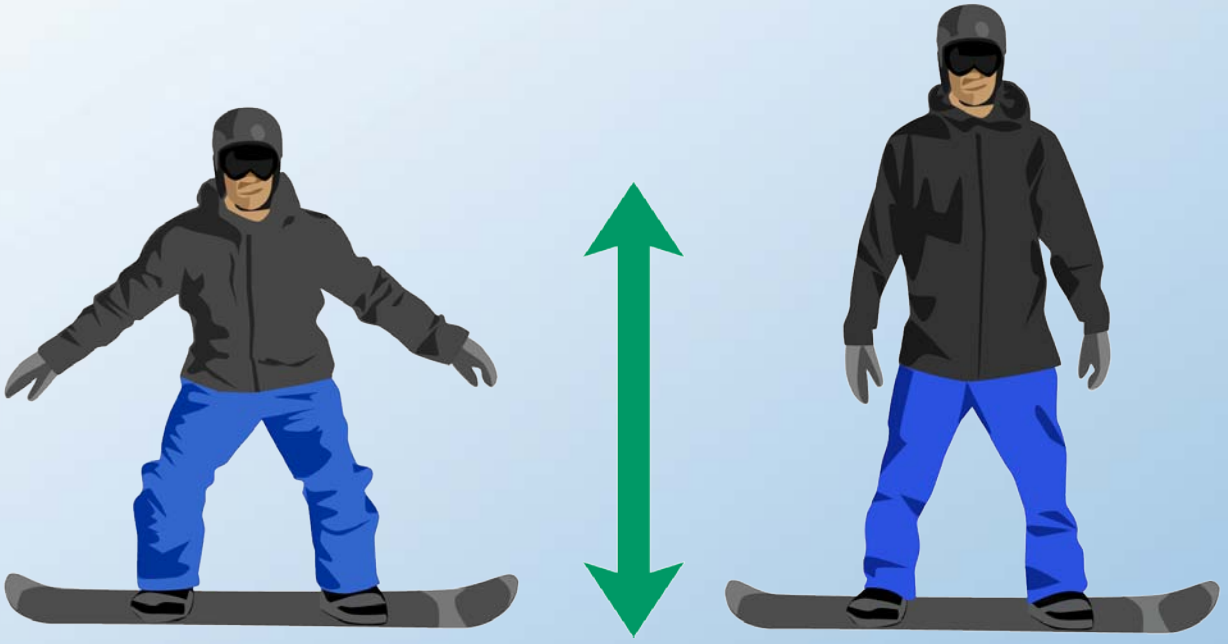
The relationship between the CM, the snowboard and the snow (up-down) along the balance axis. Upside down is always perpendicular to the snowboard but not necessarily perpendicular to the surface of the snow. Here, the joints involved are required to cooperate so that we move up and down and not side to side.

POSITIONING

2. Up-down

Absorption & Unweightning (up, down)

2. Up-down



In this perspective, we can describe concepts such as *Absorbtion* & *Unweightning (up* and *down)*

POSITIONING

3. For-aft

3. For-aft

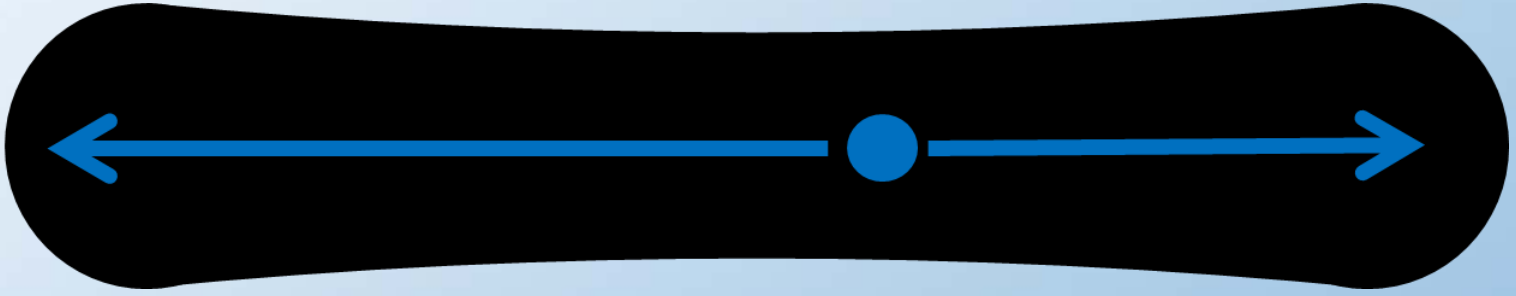
For-aft is the relationship between the CM, the snowboard and the snow, for-aft in relation to the snowboard. Here we can regulate were we want the pressure point of the snowboard to be.

POSITIONING

3. For-aft

Pressure point

3. For-aft



The pressure point is were the pressure is centered along the length of the board. The pressure point is also the rotation point in a turn. We can also influence the snowboard's "reverse camber" with the pressure point which has an effect on the snowboard's self-turning characteristics.

POSITIONING

4. Rotations

4. Rotations

In a turn, the snowboarder rotates. The rotation takes place both in the horizontal plane and in the frontal plane. The proportions depend on the inclination. A small inclination, and the rotation occur more in the horizontal plane, while at a large inclination the rotation occur more in the frontal plane.

POSITIONING

4. Rotations

4. Rotations

- Separation (CM/Snowboard)
- Rotation (CM/Snow)
- Steering angle (Snowboard/Snow)

POSITIONING

4. Rotations

Separation

4. Rotations

When we rotate one part of the body from the snowboard (around the balance axis) we call it *separation*. *Separation* is controlled with internal forces. If this is used with the edge fixed in the snow we can create a rotation. We can also use *separation* without a fixed edge in what we call a counter-rotation.

POSITIONING

4. Rotations

Rotation

4. Rotations

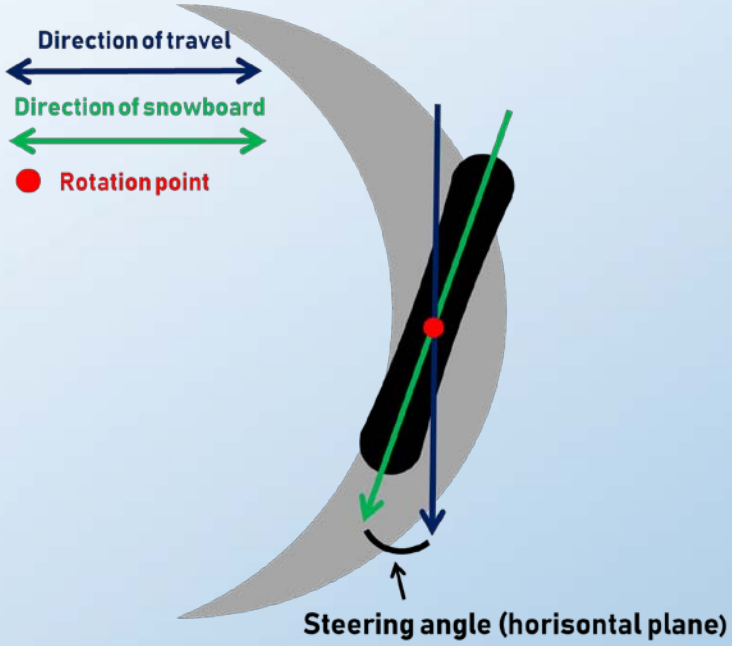
Rotation is when the snowboarder as a whole rotates in relationship to the snow (center of mass/snow). This is caused by external forces. Rotation can be be achieved by several diffrent techniques e.g. separation, peddling, snowboard's self-turning characteristics.

POSITIONING

4. Rotations

Steering angle (horizontal plane)

4. Rotations



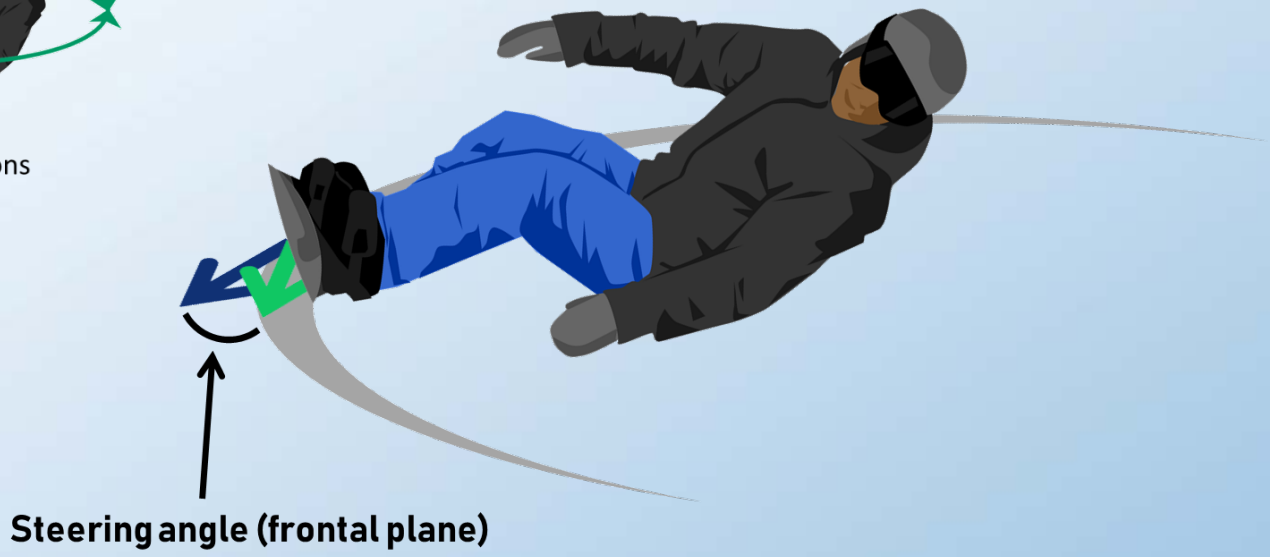
We have a steering angle seen both in the horizontal plane and in the frontal plane. The steering angle in the horizontal plane is the angle between the direction of the snowboard and the direction of travel seen from above. The steering angle (horisontal plane) has both a turning effect and a braking effect depending on the size. The turning effect increases as the steering angle increase until about 45 degrees, after which it decreases. The braking effect increases as the steering angle increases. The steering angle can be regulated both with internal and external forces.

POSITIONING

4. Rotations

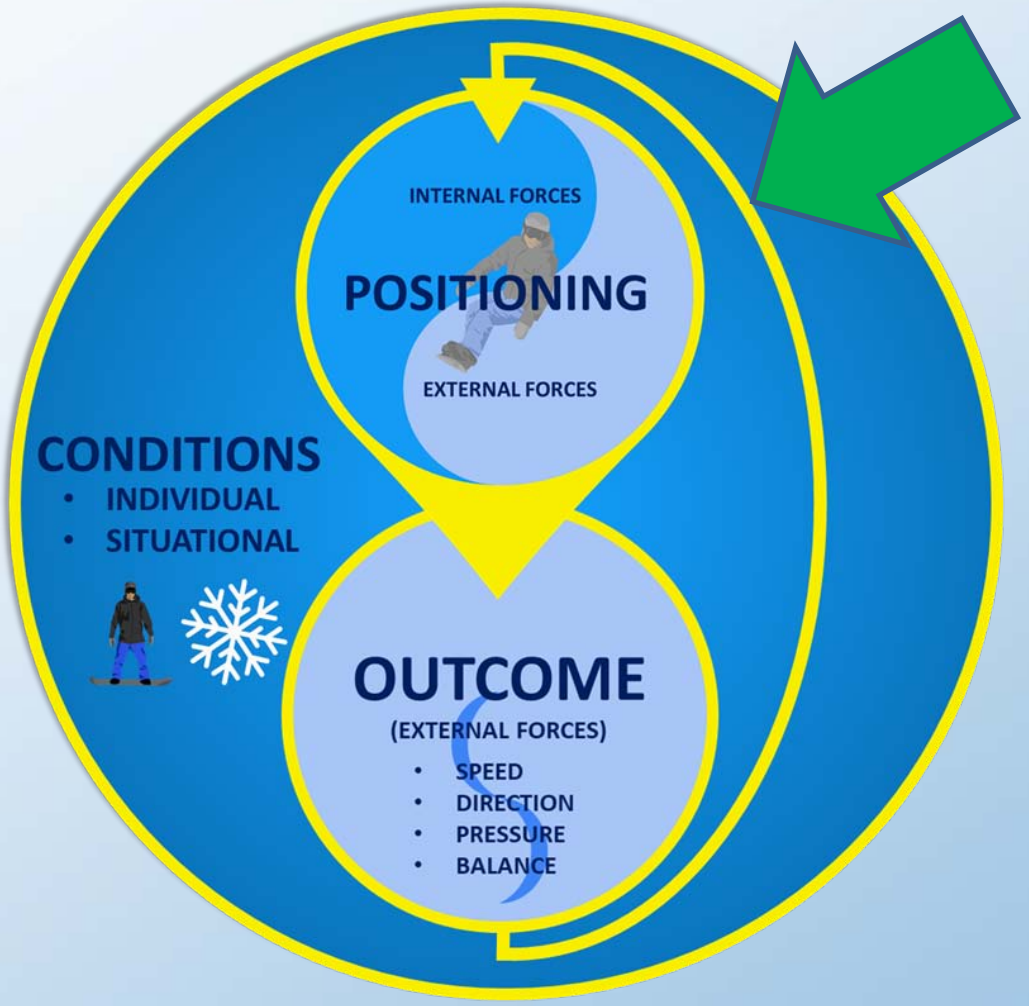
Steering angle (frontal plane)

4. Rotations



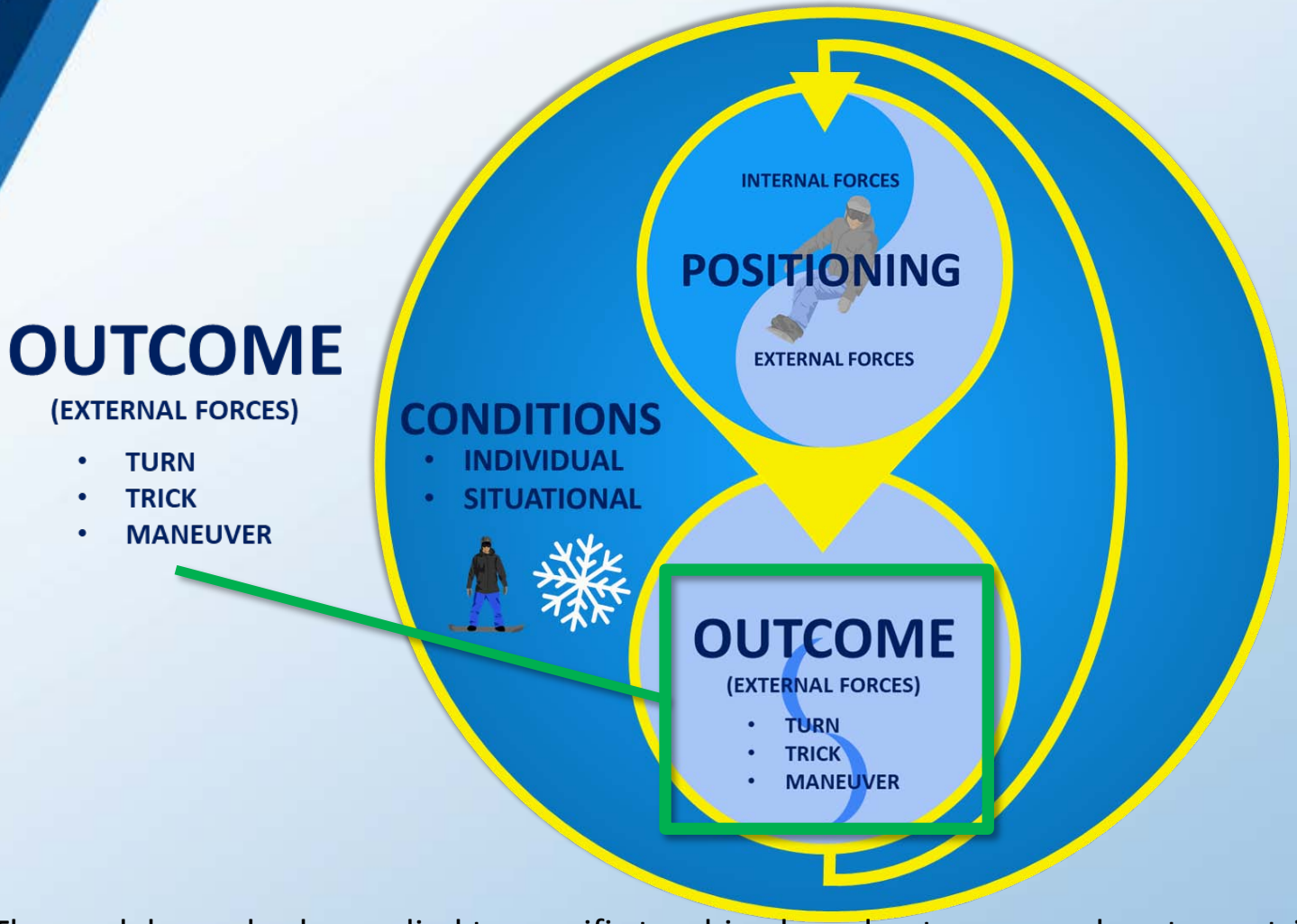
The steering angle in the frontal plane) is the angle between the direction of the nose of the snowboard and the direction of travel seen in the frontal plane. This steering angle is created through reverse camber. The steering angles turning effect is dependent on how big the reverse camber is. The braking effect is minimal with a steering angle in the frontal plane.

ONGOING PROCESS



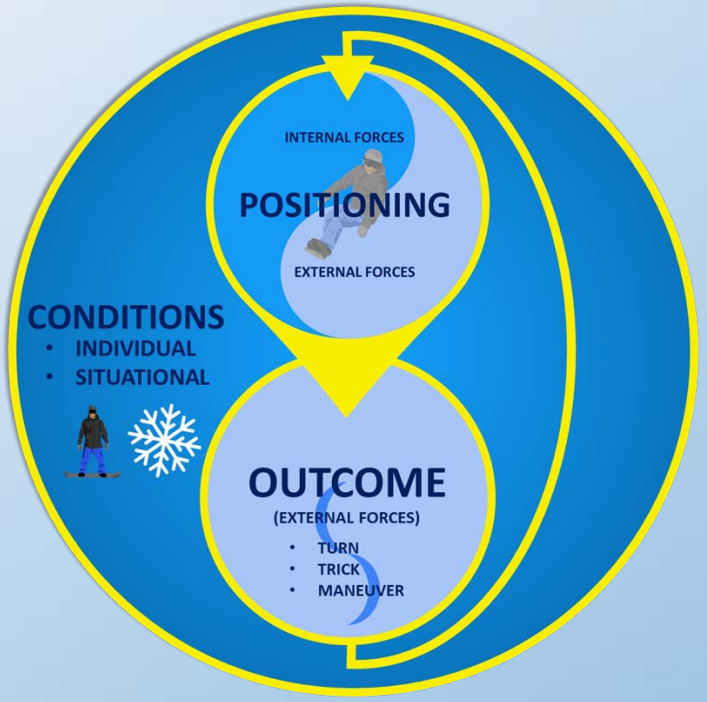
The arrow leading from *outcome* to *positioning* describes how the outcome affects the positioning in the next step in an ongoing process.

THE MODEL AS A METHOD



The model can also be applied to specific teaching based outcomes such as turns, tricks or other maneuvers. The outcome is often the goal of teaching. Here we can then match the desired outcome with conditions and positioning.

Customized Snowboard Technique



- Who is the snowboarder (individual) and what does the situation look like?
- Does the desired outcome match the individual and the situation?
- What would be the ideal positioning to master the desired outcome?

THANK YOU FOR YOUR TIME!

We appreciate feedback so we can develop this further. our contact info is:
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