Electronic Brake Force Distribution (EBD)
Electronic brakeforce distribution (EBD or EBFD) or electronic brakeforce limitation (EBL) is an automobile brake technology that automatically varies the amount of force applied to each of a vehicle's wheels, based on road conditions, speed, loading, etc. Always coupled with anti-lock braking systems (ABS), EBD can apply more or less braking pressure to each wheel in order to maximize stopping power whilst maintaining vehicular control. Typically, the front end carries the most weight and EBD distributes less braking pressure to the rear brakes so the rear brakes do not lock up and cause a skid. In some systems, EBD distributes more braking pressure at the rear brakes during initial brake application before the effects of weight transfer become apparent.
How EBD works

EBFD systems are usually made up of three subcomponents that are monitored and guided by an electronic control unit (ECU). These components include:

1. speed sensors for each wheel (sensors that monitor how fast the wheel is rotating),
2. brake-force modulators (a mechanism that increases or decreases brake-force applied to a wheel),
Electronic Brake-Force Distribution (EBD)

- Braking causes a dynamic weight transfer to the front wheels depending on:
  - Vehicle construction / geometry
  - Deceleration
- Consequence: rear wheels tend to lock first
- EBD reduces rear pressure to avoid rear wheel locking
  - Similar to mechanical brake proportioning valves
- EBD bases rear wheel control on slip rather than pressure
- Wheel control kicks in before ABS in the low-G region
  - EBD events occur frequently and are transparent to the driver
- ABS and EBD usually share the same hardware
  - Brake proportioning valve is eliminated
  - Better braking performance independent of vehicle loading
Electronic Brake-force Distribution (EBD)

- Ideal distribution of braking force with a full load
- Increased rear braking force with a full load
- With EBD
- Without EBD

Front/Rear
- Rear braking force
- Front braking force

Left/Right
- Stabilising moment

Braking force
How EBD works

Light load
- Brake force: Small
- Good brake pressure distribution
- Weight
- Small

Heavy load
- Brake potential not fully utilized

Without EBD

Light load
- Brake force: Small
- Good brake pressure distribution
- Weight
- Small

Heavy load
- Brake pressure increases with load

With EBD

Brake potential fully utilized
Advantages of EBD

- (load sensitive) proportioning valve may be omitted
- Increase of rear axle contribution to brake-force
- Approach to ideal brake-force distribution
  (straight-ahead and bend driving)
- Adaptive to different loading conditions
- Constant brake-force distribution during vehicle live time
- Monitoring of EBD-function
- Minimal extension of ABS hardware required