Off-Road Low-Pressure tires vs. On-Road DoT High-Pressure tires

Off-road, low-pressure tires (6 to15 PSI) provide superior traction, stability on rocks, and reduced trail damage by increasing the contact patch and conforming to terrain. Conversely, on-road DOT high-pressure tires (30 to 40 PSI) are designed for stability on hard surfaces, but high pressure in off-road conditions can damage trails and increase puncture risks.

Off-Road Low-Pressure Tires (Approx. 6 to 15 PSI) (38-40 Lbs. weight)

- **Best For:** Soft sand, mud, snow, and jagged rock crawling.
- **Advantages:**
    - **Increased Traction & Flotation:** A larger contact patch allows the tire to sit on top of sand or mud rather than digging in.
    - **Reduced Trail Impact:** Lower pressure distributes vehicle weight, minimizing ruts and damage to the trail.
    - **Puncture Resistance:** Tires can flex over sharp rocks rather than being pierced.
    - **Comfort:** Provides a smoother, "springier" ride over washboards and rocks.
- **Disadvantages:** Increased risk of bead-lock issues (tire slipping off the rim) if pressure is too low, requiring lower speeds.

On-Road/DOT High-Pressure Tires (Approx. 30 to 40 PSI) (48 to 50 Lbs. Weight)

- **Best For:** Pavement, gravel roads, and hard-packed dirt.
- **Advantages:**
    - **Safety & Stability:** Essential for higher speeds, offering better cornering stability and steering precision.
    - **Durability:** Less susceptible to heat buildup and excessive wear on hard, abrasive surfaces.
- **Disadvantages:**
    - **Poor Off-Road Performance:** Tires do not flex, leading to a rough ride and less grip.
    - **High Trail Impact:** Rigid tires dig into soft ground, increasing trail damage and rutting.
    - **High Puncture Risk:** Less flex means higher chance of puncture from sharp, hidden objects.

Comparison for Trail Damage & Performance

For reducing environmental impact on trails, **low-pressure tires are superior** because they do not dig deep ruts, whereas high-pressure tires tend to spin and tear up the trail. To manage both, many riders use **10-12 PSI for rocky terrain** to prevent rim damage and **6-8 PSI for soft sand/mud** to maximize float. Using beadlock wheels is highly recommended for pressures below 10 PSI.

Off-Road Tires are lighter by weight than DoT On-Road tires by approx. 10 Lbs.

OFF-ROAD UTV Tire 38 to 40 lbs.



ON-ROAD DoT Tire 48-50 lbs.



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UNSPRUNG WEIGHT & the effects on handling & Trail Surfaces

Unsprung weight is the portion of a vehicle's weight that is *not* supported by the suspension—things like wheels, tires, brake assemblies, and part of the suspension itself. Lower unsprung weight improves handling, ride quality, and traction because the suspension can react more quickly to bumps.

🛞 Why Unsprung Weight Matters

Reducing unsprung weight with a lighter tire has a compounding effect on performance because these parts move rapidly and directly with the road surface.

1. Better Ride Quality

- Lighter unsprung components can move up and down more easily.
- The suspension can keep the body of the vehicle smoother over bumps.

2. Improved Traction

- Tires stay in contact with the ground more consistently.
- Especially important for off-road vehicles, ATVs, and OHRVs—like the ones your clubs maintain trails for.

3. Sharper Handling

- Less inertia in the wheel assembly means quicker suspension response.
- Helps with cornering stability and steering precision.

4. Reduced Wear

- Lower forces transmitted into suspension bushings, shocks, and chassis.

🔧 Examples to Make It Clear

High unsprung weight example

A solid rear axle on a truck or ATV (Utility or Ranch models):

- The entire axle housing moves with the wheels.
- Heavy → slower response → rougher ride.

Low unsprung weight example

Independent suspension: (Trail Models)

- Only the wheel, hub, and small control arms move.
- Lighter → smoother ride and better control.

⚖️ Sprung vs. Unsprung Weight (Quick Table)

Component	Sprung or Unsprung?	Why
Vehicle body & frame	**Sprung**	Supported by suspension
Engine & transmission	**Sprung**	Mounted to chassis
Wheels & tires	**Unsprung**	Move directly with road
Brake rotors/calipers	**Unsprung**	Attached to wheel hub
Solid axle housing	**Unsprung**	Moves with wheels
Shocks (partially)	**Mixed**	One end sprung, one unsprung

🏁 Why Off-Road Riders Care

For OHRV and ATV riders in New Hampshire:

- Lower unsprung weight helps machines track better over rocks, roots, and ruts.
- It reduces rider fatigue and improves safety.
- It also reduces trail damage because the suspension works more effectively.

This is one reason many modern ATVs and side-by-sides use independent suspension instead of solid axles.

