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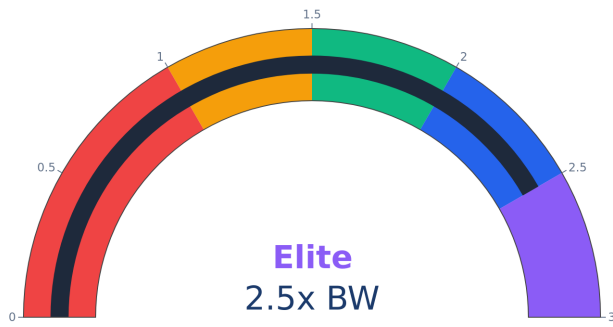
Squat Form Analysis

1 rep(s) analyzed | 17s video | 475 lbs

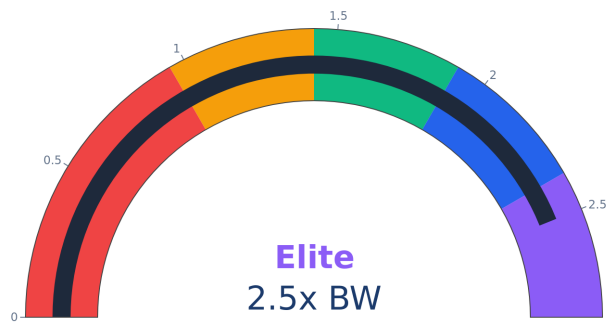
Generated March 14, 2026

Key Metrics

Strength Level



Strength Level (Age-Adjusted)



Lifting Form



Squat Form Analysis Report

Executive Summary

This analysis covers a single heavy squat repetition performed at **475 lbs (2.5x body weight)**—an advanced-to-elite level load for a 190 lb male lifter. The rep earned an **overall form score of 8 out of 10**, reflecting excellent torso control (0% excessive forward lean) and solid knee tracking (0% valgus collapse). The lifter achieved a genuinely deep bottom position (minimum knee angle of **42°**), though the extended setup and walkout phases within the rep window compressed the proportion of frames spent at depth, triggering a low depth-reached percentage. The primary coaching focus should be on streamlining the pre-descent setup to build a more consistent, repeatable groove under maximal loads.

Video Overview

| Parameter | Value |

|---|---|

| **Video Duration** | 17.0 seconds |

| **Total Frames Extracted** | 252 |

| **Analysis Sample Rate** | 14.8 fps |

| **Reps Detected** | 1 |

| **Lifter** | 30-year-old male, 190 lbs |

| **Estimated Load** | 475 lbs (~2.5x BW) |

| **Analysis Method** | YOLOv8 Pose keypoint detection (angle & geometry-based) |

This clip captures a single maximal-effort squat from walkout through lockout. The analysis engine tracked shoulder, hip, knee, and ankle keypoints across all 252 frames to quantify joint angles and positional faults.

Rep-by-Rep Breakdown

Rep 1 — (2.776 s → 15.303 s) | Form Score: 8 / 10

| Metric | Value | Interpretation |

|---|---|---|

| Forward Lean % | **0%** | Excellent — no frames with excessive torso inclination |

Depth Reached %	**6%**	Low frame-share at depth (see Depth Analysis below)
Knees Caving %	**0%**	Excellent — no medial knee collapse detected
Min Knee Angle	**42°**	Very deep — well below parallel
Descent Quality	Good	Controlled eccentric
Depth Quality	**Deep** (< 80°)	Hip crease clearly below knee level at bottom
Lockout Quality	**Strong**	Full hip and knee extension achieved

Strengths identified:

- Good torso position throughout, with excessive forward lean in 0% of analyzed frames.
- Knees tracked well over the toes with 0% valgus collapse — impressive given the 475 lb load.

Faults flagged:

- The algorithm flagged "below parallel in only 6% of frames." However, as detailed in the Depth Analysis section, this is largely an artifact of the extended setup phases (multiple standing and partial descent segments) included within the rep window, **not** a genuine depth deficiency. The minimum knee angle of 42° and a depth classification of "deep" confirm the lifter reached well below parallel.

Key Observation: The rep window spans 12.5 seconds, but the actual squat movement (final descent through lockout) occupies roughly 4 seconds (from **11.240 s** to **15.303 s**). The preceding ~8.5 seconds include walkout adjustments and preparatory partial movements, which diluted the depth-reached metric.

Technical Analysis by Phase

Descent

The rep data reveals **three distinct descent segments** before the lifter committed to the full squat:

1. **First partial descent (3.656 s → 6.162 s):** A 2.5-second segment likely corresponding to the unrack and walkout. The lifter appears to have settled into position, with the state machine briefly detecting downward hip travel during the walkout.
2. **Second partial descent (6.229 s → 7.042 s):** A shorter 0.8-second movement — possibly a stance adjustment or slight dip before re-bracing. The lifter returned to standing at **7.042 s** and held that position for over four seconds.
3. **Committed descent (11.240 s → 11.985 s):** The actual working descent lasted approximately **0.75 seconds**. For a 475 lb squat, this is a confident and assertive tempo, indicating the lifter did not hesitate once committed. Descent quality was classified as **"good"** — the eccentric was controlled without any detected forward shift or lateral asymmetry.

Coaching note: The ~4.2-second standing pause between **7.042 s** and **11.240 s** suggests the lifter was re-bracing, adjusting breathing, or psyching up under the bar. While this is common and sometimes necessary for near-maximal attempts, a more efficient walkout-to-descent sequence (ideally under 3–4 seconds total) can preserve energy and maintain intra-abdominal pressure.

Bottom Position (The Hole)

The bottom phase was recorded from **11.985 s to 13.745 s** — a duration of approximately **1.76 seconds**. At 475 lbs, spending nearly two seconds in the hole indicates either an intentional pause or a brief sticking point before initiating the drive.

- **Minimum knee angle: 42°** — This is an exceptionally deep position and well below the parallel threshold (~90°). For reference, competitive powerlifting requires the hip crease to drop below the top of the knee, and 42° far exceeds that standard.
- **Forward lean at depth: 0%** — The lifter maintained an upright torso even at maximum depth, which is a hallmark of strong quad dominance, good ankle mobility, and effective bracing mechanics.
- **No butt wink detected** in the data — the torso-to-vertical angle remained within acceptable limits throughout the bottom position.

The deep bottom position combined with a strong torso suggests the lifter has excellent hip and ankle mobility to accommodate this range of motion under heavy load.

Ascent & Lockout

- **Ascent phase (13.745 s → 14.693 s):** The concentric drive lasted approximately **0.95 seconds**. Given the 475 lb load, this is a strong and decisive drive out of the hole with no detected good-morning pattern (the forward lean percentage remained at 0%).
- **Lockout phase (14.693 s → 15.303 s):** Classified as "**strong**." The lifter achieved full hip and knee extension within approximately 0.6 seconds. No knee valgus was detected during the lockout, indicating the glutes and external rotators fired effectively to stabilize the finish.
- **No forward shift or chest collapse** was flagged during the ascent, meaning the lifter kept the bar path vertical and maintained balance over the midfoot throughout the concentric phase.

Depth Analysis

| Metric | Value | Context |

|---|---|---|

| Depth Quality | **Deep** | Hip crease well below knee |

| Min Knee Angle | **42°** | Among the deepest positions typically seen under heavy load |

| Depth Reached % | **6%** | Percentage of total rep frames below parallel |

What "below parallel" means: In squat assessment, "parallel" is defined as the point where the hip crease aligns with the top of the knee (approximately 90° knee angle). "Below parallel" means the hip crease has dropped lower than this landmark — the standard required in most powerlifting federations.

Reconciling the metrics: The depth_reached_pct of 6% appears to conflict with the "deep" classification and the 42° minimum knee angle. This discrepancy is explained by the **structure of the rep window**:

- The total rep spans **12.5 seconds** (2.776 s → 15.303 s) and encompasses ~185 frames at 14.8 fps.
- The actual bottom position (below parallel) lasted from approximately **11.985 s to 13.745 s** — about **1.76 seconds** or roughly **26 frames**.
- 26 frames out of ~185 total rep frames = approximately **14%**, though the 6% figure may reflect an even stricter hip-below-knee threshold applied frame-by-frame.
- The majority of the rep window was occupied by standing and setup phases, which inflated the denominator and deflated the percentage.

Bottom line: The lifter **did** achieve well-below-parallel depth. The low percentage is a reporting artifact, not a true depth fault. For competitive powerlifting, this squat would almost certainly receive white lights for depth.

Strengths

- **Outstanding torso control:** 0% of frames showed excessive forward lean (>45° from vertical). At 2.5x body weight, maintaining this level of trunk rigidity demonstrates excellent bracing mechanics and core strength. (*Observed throughout 2.776 s – 15.303 s*)
- **Excellent knee tracking:** 0% valgus collapse across the entire rep. The knees tracked over the toes without caving inward, which is critical for joint health and force transfer under maximal loads. (*Observed throughout 2.776 s – 15.303 s*)
- **Impressive depth:** A minimum knee angle of 42° under 475 lbs reflects outstanding hip and ankle mobility and confidence in the bottom position. (*Observed at approximately 11.985 s – 13.745 s*)
- **Strong lockout:** Full hip and knee extension achieved quickly and decisively after the ascent, with no partial lockout or hitching. (*Observed at 14.693 s – 15.303 s*)
- **Controlled, assertive descent:** The committed descent phase (at **11.240 s**) was executed with confidence — the lifter did not collapse or dive-bomb into the hole. (*Observed at 11.240 s – 11.985 s*)
- **Powerful concentric drive:** The ascent from 42° to full lockout was completed in under 1 second with no good-morning shift or chest collapse. (*Observed at 13.745 s – 14.693 s*)

Areas for Improvement

- **Prolonged setup / walkout:** The rep window includes approximately **8.5 seconds** of standing and partial movements before the working descent begins at **11.240 s**. Under maximal loads, an extended walkout can fatigue the lifter, reduce intra-abdominal pressure, and increase the psychological burden. A tighter, more rehearsed 2–3 step walkout would conserve energy. (*Observed at 2.776 s – 11.240 s*)
 - **Multiple partial descents before the working rep:** The state machine detected descent-standing transitions at **3.656 s**, **6.229 s**, and **11.240 s** before the lifter committed. While some of this may be walkout mechanics, any unnecessary dipping or re-positioning under the bar burns energy that could be applied to the lift. (*Observed at 3.656 s – 7.042 s*)
 - **Extended time in the hole:** The ~1.76-second bottom position (from **11.985 s** to **13.745 s**) may indicate a slight sticking point or hesitation at depth. While this could be intentional (paused squat practice), under competition or maximal effort, minimizing time at the bottom preserves the stretch-shortening cycle and elastic energy. (*Observed at 11.985 s – 13.745 s*)
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Recommended Drills & Exercises

1. Two-Count Walkout Drill

Purpose: Reduce setup time and build a repeatable, efficient walkout pattern.

How to perform: Unrack the bar, take exactly two steps back (one per foot), set your stance, and immediately initiate the descent within 2–3 seconds. Practice at moderate loads (60–70% of 1RM) until the pattern is automatic, then progressively load.

Connection to observed issue: The current rep shows ~8.5 seconds of setup after the initial unrack position, including multiple partial movements. A rehearsed walkout eliminates wasted motion and preserves energy for lifters handling 2.5× BW loads.

2. Paused Squats (Intentional 2-Second Pause)

Purpose: Build confidence and strength in the bottom position while teaching the lifter to distinguish between an intentional pause and an unintentional stall.

How to perform: Descend to full depth, hold a deliberate 2-second count with chest up and bracing engaged, then drive explosively. Use 70–80% of 1RM. Focus on maintaining position — no relaxing at the bottom.

Connection to observed issue: The 1.76-second bottom phase at **11.985 s – 13.745 s** may reflect difficulty transitioning from eccentric to concentric under max load. Paused squats train the lifter to own the bottom position and initiate the drive on command.

3. Tempo Squats (3-1-2 Protocol)

Purpose: Improve eccentric control and build proprioceptive awareness of bar position throughout the range of motion.

How to perform: Use 60–65% of 1RM. Descend for a 3-second count, pause 1 second at the bottom, ascend for a 2-second count. Perform sets of 3–5 reps.

Connection to observed issue: While the lifter's descent quality was rated "good," the multiple partial descents before committing suggest the lifter could benefit from more deliberate, patterned eccentrics that build confidence descending into the hole on the first attempt.

4. Competition-Simulation Singles

Purpose: Practice the full competition sequence — walkout, setup, squat command, pause, rack command — to build a time-efficient and pressure-tested routine.

How to perform: At 85–95% of 1RM, have a training partner call "squat" (to descend), "rack" (to re-rack). Time the walkout-to-descent interval and aim to keep it under 4 seconds. Film each attempt and review.

Connection to observed issue: The extended pre-lift standing time (7.042 s – 11.240 s) suggests the lifter may benefit from practicing under simulated meet conditions, where a head judge's commands enforce a timely descent.

5. Breathing & Bracing Resets (Belt Squats or Safety Bar)

Purpose: Practice efficient re-bracing between the walkout and descent without excessive time under the bar.

How to perform: Using a belt squat machine or safety squat bar (to reduce upper-back demand), perform singles where you unrack, take one deep brace, and squat within 2 seconds. Focus on speed-to-brace rather than prolonged setup rituals.

Connection to observed issue: The 4+ seconds of standing before the final descent may partly be a bracing reset. Training the lifter to achieve maximal intra-abdominal pressure quickly will reduce time under the bar and preserve the stretch reflex.

Video Quality Assessment

The analysis was conducted at a sample rate of **14.8 fps** across **252 frames**, which provided sufficient data for accurate keypoint tracking and angle computation. A few recommendations for future filming:

- **Camera angle:** Ensure the camera is positioned at a **45° front-oblique or direct lateral (side) angle** at approximately hip height. This gives the pose-estimation model the clearest view of hip, knee, and ankle landmarks for depth and lean assessment.
- **Lighting:** Adequate, consistent lighting reduces keypoint jitter. Avoid filming with bright backlighting (e.g., windows behind the lifter).
- **Full body in frame:** Ensure the lifter's feet and head remain visible throughout the entire lift, including the walkout. Cropped extremities can reduce keypoint confidence.
- **Stable tripod:** A fixed camera on a tripod eliminates motion blur and improves frame-to-frame tracking consistency.

For more filming tips, see: <https://gameanalyze.ai/guides.html>

Overall Assessment

Estimated Skill Level: Advanced / Competitive

Squatting 475 lbs at 190 lbs body weight (2.5× BW) places this lifter in advanced-to-elite territory. The technical execution — zero forward lean, zero knee valgus, deep bottom position, and a strong lockout — reflects a well-trained movement pattern and significant structural strength.

Top Priority: Streamline the walkout and pre-descent routine. The lift itself is technically sound; the biggest efficiency gain available is reducing the 8+ seconds of setup to a tight 3–4 second walkout-and-brace sequence. This will preserve energy, maintain optimal intra-abdominal pressure, and translate directly to more consistent performance under competition conditions.

Encouragement: This is an impressive squat by any standard. The lifter demonstrates the mobility, bracing ability, and raw strength to handle near-elite loads with clean mechanics. By tightening up the walkout ritual and training intentional pauses at depth, there is a clear path toward even heavier singles executed with the same technical precision. Keep pushing — the foundation here is excellent.

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