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Ketty PHDee

PART 10: KETTY PHDEE Why you should study it!

Welcome Forkers, to the *Ketty PHDee's Slingshot Science* series: A 10-meter journey from Slingshot family fun to competitive Forker. We take a mid-season break to review why *Ketty PHDee* is not based on a singular revelation or short-hand tricks to success, but a compelling, clarifying narrative that frames the holistic practice of slingshot shooting, in South Africa.

Part of the charm and challenge of *kettie* shooting is its paradox. It is both a low-barrier, easy inclusive activity that families can enjoy together and a high-velocity, high-skill sport that rewards meticulous measurement and patient refinement. The purpose of my *Ketty PHDee* series is to anchor the narrative of *Kettie* in the South African context, where a vibrant ecosystem of clubs, associations and a national federation (SASF), and sponsors coexists with practical constraints – weak financial currency, varied access to international gear, and a local cultural appetite for domestic innovation. *Ketty PHDee* is not a generic brochure for a slingshot hobby; it is a field guide to the “sport of slingshot” that demands that the shooter (athlete), the equipment, and the environment be understood in unity - as a single, interdependent system.

From slingshot to science: Naming, rules, and the path to mastery.

The *Ketty PHDee* series opens by reintroducing readers to *kettie* shooting – the sport known across continents as a slingshot, but labelled differently in various regions, such as catapult in many parts of Europe, *katty* in Ireland, and *rekker* in Afrikaans. The meaning of “slingshot” is not a translation or reference and should not be confused with the Biblical weapon (in Afrikaans: *Slingervel*). I emphasise precision in language because the terminology is more than academic; it maps to the equipment itself and the techniques that determine success. The *kettie* is described as a V-forked frame with a pouch for the pellet and elastic bands for propulsion - as a gateway to a modern discipline that blends historical craft with contemporary materials science.

The introduction of the series also refers the readers to SASF – the South African Slingshot Federation (www.saslingshot.co.za) – and its standard discipline rules (sports code) for indoor competition at 10 meters. The *kettie* frame must fit into a 200 mm square; there may be no arm brace or support (a lanyard is permissible), and the pouch may not have moulded seating impressions. Materials may be diverse: wood, plastics, resins, carbon, aluminium, titanium – there is freedom here, but freedom comes with responsibility. The bands should be flat (not tubes), typically 4.5 to 0.6 mm, and draw lengths may be short, semi-butterfly, or butterfly, but no mechanical trigger release. The most concrete constraint is energy: SASF targets require a knock-down power of 2 foot-pounds of energy (fp/e) per target, with pellets standardised to 8 mm steel for indoor use and 8 to 10 mm “safety pellets” for outdoor play or field targets.

The emphasis on measurement is a through line of the entire series: “To measure is to know” (*meet is weet*) becomes a refrain. Progress in *kettie* shooting is only achieved by understanding and applying scientific truth, not by clinging to tradition or fashionable myths. The series introduced you to the Precision-Accuracy Matrix (PAM) as a practical framework: **Precision** is internal ballistic potential—the inherent capacity of the *kettie* setup to propel a pellet in a predictable pattern – while **accuracy** is the external ballistic reality – the ability to place that potential on a given target at a given distance under real-world conditions. The two are in dialogue – you can have a highly precise rig that is only occasionally accurate under wind and gravity, or a perfectly tuned shooter who can coax accuracy from a modest hardware setup through technique and practice.

A practical path: Gear, practice, and the 10 m standard

Right at the outset, I acknowledged a fundamental truth – equipment matters, but it does not replace practice, thus experience, therefore is no substitute for experience. The recommended equipment entry point is a dependable, all-round “GUS” *kettie* (general utility slingshot) with a pinch-grip frame, OTT attachment, a fork width of 80-90 mm, a clip system to secure bands, natural latex flat bands, and an appropriate pouch design. I cautioned against over-engineered set-ups with flat bands or exotic configurations – at least initially. The aim is to reach the 10 m standard discipline line, to be open to core knowledge learning, and to do so with a sustainable plan that emphasises repeatability, safety, and purposeful progression, to develop elective knowledge.

Two practical pillars guide the 10 m journey. The first is a disciplined approach to practice that blends form, technique, and mental preparation. I emphasise the difference between “shooting *kettie*” for fun and “practising the sport.” The second pillar is a method for assessing progress through data. The series introduces a minimum viable practice regime: three full standard disciplines per week, a realistic time investment given a 5-minute, 10-shot competition discipline, and a broader commitment to consistent, repeatable mechanics. Sport psychology is highlighted as perhaps more critical than raw strength: the

mind governs the consistency and resilience needed to sustain clean technique across a shooting session, a day event, or a season.

The PAM framework then translates into practical measurement. Internal ballistics – pellet speed, energy, and the mechanism of propulsion – which must be understood in relation to external ballistics, such as wind, gravity, and air resistance, that alter the point of impact. I emphasised that velocity is not the sole determinant of scoring success; it is only a proxy for energy delivery to the target. The “terminal velocity” question becomes a guiding principle: what energy level is necessary to consistently knock down a standard target? In SASF terms, a practical baseline is a 32.6-grain (2.11 g) pellet travelling around 200 ft/s, delivering roughly 3 fp/e at 10 m, with higher velocities (up to roughly 240-280 ft/s) providing greater margin for tenable knock-down at longer ranges. But there is a cost – more velocity can come with increased complex dynamics in the system, fatigue, band wear, and much more. The core message is that balance, between velocity, energy transfer, and physical control, is the essence of “fit for purpose”, the objective of a full score.

The language of the slingshot world: Lingo, slang, and the quiet ritual of practice.

Part of the series’ charm, lies in its glossary of the *kettie* slang, but more importantly, it maps language to function. Terms like “Forker” (the shooter), “TTF/OTT/TTT” (Through the Fork, Over the Top, Through the Throat band attachments), and “Gangsta style” (180-degree horizontal grip) illustrate how



technique and hardware align. The “pouch” is a central piece – its design (flat, cupped, single-hole or multi-hole), each carries implications for stability, consistency, and ease of pellet seating. I cautioned against cupped or moulded pouches, which are not legal in tournaments, and against poor pouches that distort seating and compromise repeatable measurements. The lingo also covers ballistics and shot performance: CEP (Circular Error Probable) and MER (Median Error Radius) quantify precision; GP_POI (Groups for Precision) and GA_POI (Groups for Accuracy) describe bench-based and field-based group testing, respectively.

In this *kettie* language-rich section, the series commits to clarity – the practical aim is to master the 10 m line with a standardised, reproducible method for evaluating precision and accuracy, then to translate those measurements into better performance in competition. The “hand myth” is debunked – contrary to common belief, it is the rear hand, which anchors the pouch and guides the shot, that is primarily responsible for precision, while the front or leading hand contributes to stability (accuracy) – reinforcing the accountability of shooter technique in a sport with many moving parts (metrix).

The ballistics of round balls: Wind, gravity, and the myth of flat shooting.

As the narrative advances into the physics of round-ball sling-shots, I repeatedly debunk myths and replace them with measurable phenomena. I insist there is no such thing as a flat-shooting *kettie*. Once the pellet leaves the pouch, gravity immediately begins to act, and wind can deflect a less spherical projectile in complex ways. The text emphasises that even with spinning or non-spinning pellets, aerodynamic drag significantly



influences the trajectory and the pellet's stability is affected by surface imperfections, density, and aerodynamics. The concept of axial form – how a pellet's cross-section and overall spherical consistency interacts with airflow – recurs as a central theme; I have warned against simplistic correlations with firearm ballistic coefficients or “flat-shooting” fantasies.



Wind is addressed with practical calculations: wind angle, wind speed, and the sine components that describe lateral deflection. As the wind angle increases toward perpendicular, the deflection grows, demanding greater gap shooting in aiming references. Gravity, too, is a constant across distances, yet the drop is a function of velocity, pellet mass, and the pellet's path through air. The higher the pellet's speed, the more distance it can travel before gravity pulls it down to a distant impact point, but the trajectory remains curved, not linear. I remind readers that the path is not a perfect line, and the art of *kettie* shooting is learning to anticipate and counteract these dynamics in real-world conditions.

Shot group theory revisited: Measuring the unseen.

Part 5 and Part 6 dive into the statistical underpinnings of shot groups. The journey from a bench-based GP_POI test to a live GA_POI test is a journey from controlled measurement to practical application. The Circular Error Probable (CEP) and the Median Error Radius (MER) are treated not as abstract concepts but as practical targets: if a *kettie* rig can place 50% of hits within a small circle at 10 m, it is a platform with meaningful precision. I presented a concrete testing method: a bench-based 50-shot data set that yields MR and ES; a separate GA_POI test at 10 m to compare real-world accuracy. I introduce and propose the "USSP" universal standard measurement: a *kettie* rig should place 25 out of 50 shots within a 2 cm circle at 10 m to be considered precise at that distance.

In practical terms, a good *kettie* must deliver consistent groups, not just occasional miracles. The text emphasises the danger of relying on a small shot-count sample. A 5-shot string can be very misleading about overall actual precision, while a 50-shot series can reveal the true dispersion and the reproducibility of the setup. The concept of non-deterministic influences - wind, temperature, pellet seating, band pre-stretch – is acknowledged as a factor that can blur the line between precision and accuracy. Yet I insist on disciplined measurement and disciplined experimentation, changing only one variable at a time, and then retesting to isolate effects. This is science in motion, and the payoff is a method that translates neatly from bench to range.

Flatbands and the engine of performance: The part 7 and 8 narrative.

In the central chapters devoted to components, flatbands are named the heart of propulsion – the "engine" of the *kettie*. I argue that the quality of natural latex flatbands is a primary determinant of repeatability, stability, and energy transfer. The *Ketty Pro Elite* line – custom, hand-made bands in yellow, pink, blue, and white print with precise taper geometries – is presented as an exemplar of disciplined design. The bands' mass, thickness (gauge), length, taper, and attachment method all influence draw force, energy delivery, and ultimately velocity, translate to dispersion (precision) and accuracy.

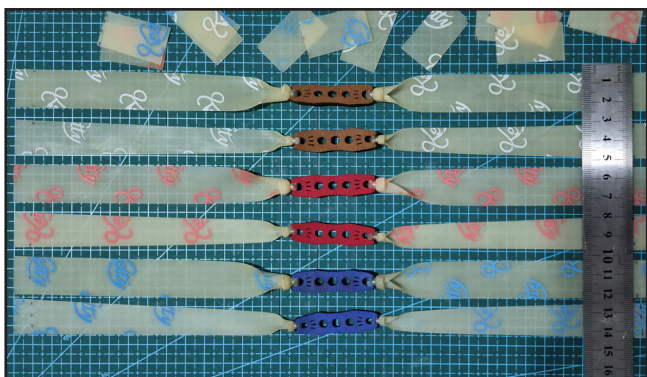


A significant portion of Part 7 is dedicated to the long-standing debate about straight-cut versus taper-cut flatbands. I acknowledge that taper-cut bands can yield higher velocity for a given draw and band mass, but only when the mass is equal and draw strength is matched. The empirical tone is careful: results vary with pellet mass, temperature, draw duration, and specific brand characteristics of the band. A key observation from experiment-like data shows that in some cases, taper-cut bands outperform straight-cut bands in velocity with a similar or even lower draw weight. But, the performance is not universal, as TC bands tend to have poorer SD resulting in poorer MEC. I advocate a rigorous, controlled; “bands-to-bands” test protocol, with identical pellets, environment, and draw parameters, to establish reliable baselines. The thinking of buying popular brand name bands is equal to performance, is totally misguided.

Band affixing and pouch metrics are not after-thoughts - they are essential to repeatability.

Wrap-and-tug is presented as a robust method that reduces band slippage and ensures the band ends remain aligned with the pouch and prongs during draw and release. The “ears” of the band should extend minimum beyond the pouch, and binding should be snug against the pouch to minimize length changes during draw. The interaction of the pouch with the band, the shape of the pouch, and even the distance from the pouch to the fork all influence the band’s contraction dynamics, the model’s energy delivery, and the shot’s consistency.

Part 8 deepens the theoretical band physics, venturing into the molecular world of natural latex and cross-linking. Latex is described as an elastomer – a viscoelastic polymer network whose properties are governed by cross-link density, chain entanglement, and the physical environment. The discussion ventures into the micro-mechanics of band stretch and contraction, where entropic factors and bond-angle distortions contribute to elasticity. I emphasise that real-world band behaviour deviates from ideal Hookean springs (models/theory), and that the contraction can be anisotropic and wave-like, travelling from the release end toward the fork, unevenly. This nuanced picture is not merely academic; it informs how one should tune band mass, taper, and attachment to achieve predictable performance over the course of a tournament’s rounds.



The practical upshot is a discipline that rewards data-driven tuning. If taper-cut bands can deliver velocity advantages, the shooter must verify that these gains persist when the tester holds draw length constant, when the environment changes, and when the pellet’s surface impedance (drag, shape imperfections) affects stability. The final takeaway is that a high-quality, consistent flatband – like *Ketty Elite Pro* is essential for peak performance, and that band maintenance -regular checks, proper storage, and timely replacement – is a non-negotiable habit for serious competitors.

Part 9: Synthesis, inquiry, and the road ahead

The concluding part is a reflective synthesis: the taper-cut debate is not a simple good-vs-bad dichotomy, but a nuanced inquiry into the tipping points where velocity gains translate into actual, measurable improvements in target knock-down and score. I reiterate the infinite complexity of shooting as a system with countless interdependent variables. They embrace the reality that perfection in ballistics is unattainable, yet insist that the “optimal operational orientation” – the ability to combine the athlete’s skill with fit-for-purpose equipment – can produce repeatable, credible success. The aim, again, is not to chase a mythical score but to cultivate a practical pathway to becoming a 10 m standard discipline club champion.

The series parts 1-9 close with an invitation of the reader to live experiments: to participate in field trials that compare taper-cut to straight-cut bands under controlled conditions, to document observations, deductions, and practical conclusions, and to feed those insights into the ongoing practice cycle. The overarching mission is clear: *kettie* shooting is a discipline that can be taught, learned, and refined through disciplined experiment, rigorous measurement, and relentless practice. The 10 m standard line is the horizon, but the journey, through PAM, GP_POI, GA_POI, CEP, MER, and the micro-dynamics of flatbands and pouches, is where mastery takes shape.

The Narrative That Transforms Practice into Progress.

What makes *Ketty PHDee*’s narrative compelling is not a singular revelation about an ideal gear choice, but the clarity with which it frames a holistic practice. It invites a new fork, a family member, or a seasoned shooter to become both observer and architect of their own performance. It tells you to seek a balance – between frame geometry and band energy, between precise seating and



repeatable release, between the bench-test's sterility and the range's variability. It invites a mindset that treats every practice hour as a data collection session, every shot as an experiment, and every miss as a source of information rather than a personal indictment.

The 10 m line is the starting point, not the finish line, 15 meters and 20 meters still awaits! But. The master of 10 meters – always reign. The PAM matrix asks for balance, the GP_POI and GA_POI tests demand discipline, and the flatbands' micro-dynamics remind us that the device's heart beats in every draw, every release, and every measured velocity. The ultimate message is practical and hopeful: with careful setup, consistent practice, and rigorous measurement, *kettie* shooting can move from your pastime into a respected sport, with a clear path toward club championships and, possibly, national recognition in a well-supported federation ecosystem.

What you can do next, right away.

- Start with the fundamentals: a stable GUS *kettie*, a simple pouch, flatbands designed for competition, and a standard 10 m indoor target setup. Learn the SASF rules, and acquire your safety gear (eye protection) and standard pellets (8 mm steel within the specified mass range). Visit: www.ketty.co.za
- Build a practice routine that mirrors competition. Three practice sessions per week, each including a GP_POI-style bench session (10 shots at 10 m, repeated five times) and a GA_POI-style live-fire set (10 m, free-hand). Keep a log of data: MR, ES, and, when possible, velocity SD.
- Create a controlled band-test protocol to compare straight-

cut versus taper-cut bands. Use the same pellets, the same environment, and the same draw length to minimise confounding variables. Note the results and examine whether velocity gains are matched by gains in precision.

- Pay close attention to band seating and attachment. Wrap-and-tug is a reliable method, ensures symmetry, and checks that the band ends stay snug against the pouch. Replace bands on a cycle that anticipates fatigue, not on the basis of a single performance dip. Look at *Ketty Elite Pro* bandsets – the best compaction sets in the world.
- Practice the mental side of the sport. Sport psychology matters in a discipline where one shot can alter the outcome of a tournament.

In the *Ketty PHDee* series, the humble *kettie* shooting emerges as a science of practice, a craft of measurement, and a culture built on shared standards and local adaptation. It respects *Die Voortrekkers'* cultural custodianship of *kettie*, and the respect for SASF as the pioneers of organised (codified) *kettie* shooting sport in South Africa and companies like *Ketty Pty.Ltd*, providing quality products - while inviting global curiosity about how a simple fork, a pouch, and a strip of latex can become a serious athletic instrument. It speaks to parents and kids who want a family activity that can become a lifelong pursuit; it speaks to clubs seeking structured development programs; it speaks to manufacturers who aim to deliver reliable, repeatable gear; and it speaks to researchers who want to quantify performance in a way that makes sense to athletes, coaches, and organisers alike.

Thank you for participating in this exciting phase of the *Ketty PHDee* series. In the next season of *Ketty PHDee*, we will endeavour to continue to discuss the significance of pouch metrics, grip inconsistencies, and circle back to pellet jump, leading on to actual shooting techniques. 🏹

