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The Equipment and Facilities Specifications Newsletter

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WELCOME TO NEW SUBSCRIBERS

This Newsletter is a semi-annual educational tool for Implement Inspectors, Technical Managers, interested Throws Officials, and certification chairs. Input and suggestions are always welcome. This copy is being sent to about **860** officials around the world. We welcome our new subscribers with this issue:

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CHAIRMAN'S CORNER

For the last several years there has been an effort to pin down the specifications for the throwing weight. To date we have not been able to come up with something that will make sure that the center of gravity (CG) is close to the center of the ball and that we can check with some degree of certainty. For the outdoor weight, this is not a problem. The metal weight can be filled completely and so the interior material can be specified as not being able to move. The problem is with the indoor weight.

Unless the indoor weight is an outdoor weight covered with rubber or synthetic material, the interior must not be completely filled. Since there are no weights such as that, we have to allow for incomplete filling of the interior. The reason for this is that, unless there is a void in the interior, the ball will eventually break under the pressures of landing. When the weight hits the ground it will deform. That change in shape causes the volume to decrease temporarily. Without a void, there is no place for the fill material to go and so the pressure is transmitted to the bladder. The most common example of this problem is referred to as "water hammer." This occurs sometimes with plumbing when a water valve is turned off suddenly and results in banging of the pipes.

The problem then becomes one of determining that the CG is within bounds. Since the material has a void, and is composed of particles, it moves. Any attempt to locate the CG will result in the void appearing at the top of the ball no matter how it is positioned. In such a position, all we know is that the CG is above the bottom point of the ball. We don't know that it is within any particular distance of the center of the ball.

Ivars and I had been working on the rule that was brought up last year. He found a formula that would report the CG distance from the center of a sphere given the diameter of the sphere, the height of the void and the density of the fill material. With a large ball and 35 pounds of fill with the average density of lead pellets, the void was a bit over an inch and the CG was just over 8 mm from the center. If the fill material was lead, the CG would have to be within the limit and we would not have to measure that distance. That assumed a thickness of the bladder that was what most manufactures are using. So we proposed such a rule.

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The problem is that there are throwing weights out there that use tungsten as their fill material. Gill has a 35 pound weight in their current catalog that they are selling for $1500 (the 20 pound weight is $880). Tungsten is much heavier than lead. Therefore, to keep the CG within limits, some material must be used with the tungsten. Over time, the tungsten and the other material will tend to stratify with the tungsten moving to the bottom of the fill material. That will, of course, move the CG out further from the center. Even if we ask the manufacturer to certify that the CG is within limits when sold, that may change over time. We can't determine where the CG is with any accuracy, so we have a problem.
Our rule change proposal was withdrawn since we had not allowed for the tungsten weights. We do intend to attempt to come up with another rule this year, but we are stumped as to how to go about it.

There was a change this year, but that was to bring the CG back to the previous distance. For a long time the rules had the CG within 9 mm of the center. That was changed inadvertently to 6 mm a few years ago. That was changed back this year so it is once again 9 mm. The hammer specification remains at 6 mm.

Anyone receiving this newsletter is welcome to help put it out by submitting articles. These articles need to relate to the subject of the committee. Any problems that come up may be sent to us as well. Keep us informed as to what is happening out there.

E&FSS ANNUAL CONVENTION MEETING

The subcommittee annual meeting was held on December 1st in St. Louis, MO.

The meeting minutes will be posted soon at: http://www.usatf.org/groups/officials/info/meeting-minutes-and-reports.asp

The last newsletter contained a summary of implement inspection reports from meets in 2011. Additional reports have been received since then, and Bob has revised the summary and presented it at the annual meeting: http://www.usatf.org/events/2011/AnnualMeeting/library/2011-EFSS-Implement-Reports.pdf

RULE CHANGES AFFECTING EQUIPMENT OR FACILITIES

High school rules changes were listed in the last newsletter.

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The NCAA did not make any changes to the hammer rule as was done by the IAAF and USATF. Therefore, the NCAA rules still mandate both minimum and maximum hammer lengths.

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The following USATF rules changes, as regards equipment & facilities specifications, were made at the annual meeting in St. Louis:

Item 9, Rule 195.4: Restores the CG of the throwing weight to 9 mm (no other change proposals for the weight from 2010 and 2011 were accepted).

Item 19, Rule 123: Expands on the responsibilities of the Technical Manager (conformance with IAAF Item 5, Rule 123, but the direct oversight of the Inspector of Implements was removed).

Item 33, Rule 149: T&F performances made outside of a traditional athletics facility shall be valid only if the appropriate, officials, equipment, implements, facilities and surveys are present or have been accomplished (conformance with IAAF Item 20, Rule 149, except the wording for permits was removed, and wording for surveys was amended).

Item 35, Rule 160.6: Adds width dimensions to in-stadia and out-of-stadia starting lines (conformance with IAAF Item 21, Rule 162.1).

Item 41, Rule 164.4: Modifies the width dimensions for out-of-stadia finish lines (conformance with IAAF Item 26, Rule 164.1).

Item 48, Rule 170.25: Modifies the specifications of the baton (conformance with IAAF Item 32, Rule 170.12), and renumbers the paragraph to 170.4.

Item 60, Rule 183.8: Modifies the allowable taping of or addition of other protection to the PV pole (conformance with IAAF Item 43, Rules 183.11).

Item 65, Rule 191.9: Deletes the minimum length specifications of all hammers (conformance with IAAF Item 48, Rule 191.9).

Item 68, Rule 212.9: Clarifies the banking specification of an indoor track (conformance with IAAF Item 50, Rule 213.3).

Item 69, Rule 212.10: Clarification of indoor track curbing (editorial change).

Item 77, Rule 262.4a: Wind gauge requirements changed from "ultrasonic" to "non-mechanical" for world record performance applications (conformance with IAAF Item 25, Rule 163.11).

Item 79, Rule 263.1: Modifies the definition of an outdoor track, as regards record performances (conformance with

IAAF Item 66, Rule 260.18a).

Item 80, Rule 263.6: Modifies the definition of an oval track, as regards record performances (conformance with IAAF Item 67, Rule 260.18c).

Item 81, Rule 263.8: Modifies the definition of an indoor track, as regards record performances (conformance with IAAF Item 69, Rule 260.21).

Item 82, Rule 264.4: Clarifies the runway, landing area and throwing circle specifications as regards record performances (conformance with IAAF Item 66, Rule 260.18a).

Item 84, Rule 265.5c: Clarifies the course verification requirements for road race records (conformance with IAAF Item 71, Rule 260.28); Rule 265.5b: also revises the course layout requirements for records.

The final scorecard is available at:
http://www.usatf.org/events/2011/AnnualMeeting/library/USATF%20Rules%20Committee%20Report%20-%20Final%202011.pdf

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IAAF rule changes are mostly echoed by the foregoing USATF changes, and are not repeated here. However, there is one change of note:

Item 45, Rule 187.1: The Youth Girls category is split off from Junior Women/Senior Women and given their own throwing implements. The new implements are 3 kg shot & hammer, 1 kg discus and 500 g javelin. This change is also propagated into the specification tables of Rules 188.5, 191.9 and 193.6. The specifications for the shot, hammer and javelin are the same as in the WMA rule book.

The 2012-2013 IAAF rule book is available at:
http://www.iaaf.org/aboutiaaf/publications/rules/index.html.

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There were no equipment or facilities rules changes for WMA. Because of this, however, it should be noted that the WMA rules continue to mandate a minimum hammer length, although the IAAF rules have now eliminated that requirement.

The WMA rules of competition and appendices have been reformatted and are available at:
http://www.world-masters-athletics.org/laws-a-rules/rules-of-competition
and
http://www.world-masters-athletics.org/laws-a-rules/appendixes-and-tables

EQUIPMENT CORNER

If you have any information on equipment that you have purchased or built to help with your weight and measures or technical managers' activities, please pass along the information. One of our goals is to disseminate this type of information.

NCAA Pole Vault Helmet

NCAA Rule 2-6-6 was adopted with the 2007 season and states: "Pole vault helmets are permissible. If worn, a helmet certified by the ASTM standard is recommended."

This change was modified in the 7/19/11 news release: http://www.ncaa.com/news/ncaa/2011-07-19/panel-approves-rule-adjustments (at the bottom of the link), saying that *schools* must ensure the helmet complies with the ASTM specification.

According to Bob Podkaminer and published interpretations, the officials in charge of the event are ***not*** required to inspect the helmets. That is the responsibility of the coach and athlete.

For the record, the standard in question is ASTM F2400-06: http://www.astm.org/Standards/F2400.htm. Helmets that meet this standard will have a sticker similar to this:

The "ASTM 2400" logo must be present. Note: The "ASTM 1447" logo in the picture refers to a bicycle and roller skate helmet standard which is not applicable in this discussion.

Steel measuring tapes

The last newsletter discussed the need for calibrating steel tapes so that they may be used for record performance

certifications. Calibrated tapes may also be used to check all other tape measures in your inventory for accuracy. This subject will be further explored in a future newsletter regarding how to check tapes and thermal expansion problems with tapes.

However, a small inventory of quality 100 meter stainless steel tapes (BMI Pontarit, Germany), with leaders, was recently found in a distributor's warehouse. This particular model, 2473P330TLFR**,** was discontinued a few years ago, making this a noteworthy find. This model is metric on one side, and has English engineering units (feet, 1/10s of feet, 1/100s of feet) on the other side. This type of tape is suitable for certification at one of the agencies listed in the last newsletter, and used as a "gold standard."

The tapes are $176.13 each. Contact Mike Duvall at 800-955-9109.

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Surface Roughness

Shots are required, by rule, to have smooth surfaces. And discuses are required to have smooth rims. The following are suggestions for dealing with these implements when they develop surface roughness.

1. Gouges in the metal, that could be used as **finger holds**, should be assumed to be unfair advantages to the thrower. Such gouges are not normally repairable in the field; therefore, those implements should be impounded. Gouges that offer no finger grip to the athlete can be disregarded.

2. Metal burrs can also be finger holds. A fine metal file can be used to remove such burrs, restoring the implement to use. However, an inspector should run his fingers over the filed area to ensure the burrs are completely removed, and no other surface features remain, like a gouge, that could add advantage for the thrower.

3. Tarnish or rust can produce an implement whose surface is similar to sandpaper, resulting in unfair advantage. Similarly, in indoor shot that is used on a concrete or gravel surface will quickly develop a rough, unfair surface.

There are a number of products that can be used to correct the latter case, such as scouring pads and sanding blocks. However, Dale Soettje, of the Oregon Assn, brought to our attention a class of product known as drywall screens. They are available as small, flexible screens that are inexpensive, and come in several grit sizes. We have recently used them to quickly and adequately correct rough indoor shots. Two companies that offer this product are 3M and Norton:

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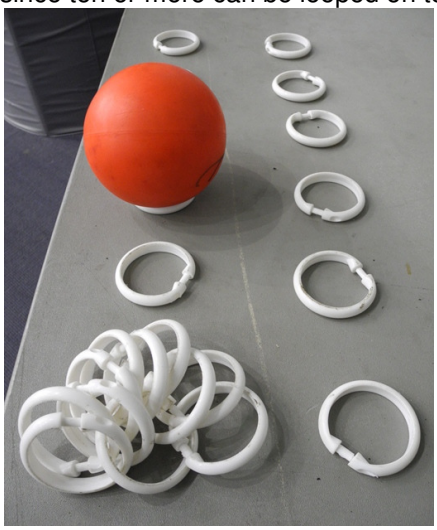
Anti-Roll Devices

Shots & hammers have a propensity to roll off the receiving table when presented for inspection. Many inspectors use worn-out sanding disks as holders for these implements. Used sanding disks work well in this role, as they are usually free if you know someone who uses them, and they are robust.

Another option is to use shower curtain rings. Plastic shower curtain rings are frequently available at dollar stores, costing $1 for 10 or more rings. Storing them is also convenient since ten or more can be looped on to one ring.



THE TRAINING CENTER

This is a regular feature of this newsletter, where we discuss the method of measuring an implement, venue or a track facility. Your comments or areas of interest are welcome. It is through this kind of dialogue that we learn from each other and improve our skills. Send the editor your stories and questions.

HJ & PV Crossbars

One easily-overlooked specification is that for the vertical jumps crossbars. This is a check that should be done for every facility at the beginning of the season, and prior to championship meets. The crossbar specs vary slightly by rulebook, so check and understand the differences. An overview is presented here. WMA rules are not called out, as they copy IAAF rules in this regard.

1. Material. The rulebooks are generally consistent, but not identical:

IAAF: Fiberglass or suitable material, but not metal
USATF: Fiberglass or suitable material
NCAA: Suitable material
NFHS: Nonmetal

2. Cross-section of the bar. The IAAF, USATF and NCAA mandate a crossbar with a circular cross-section, and a diameter of 30 mm ± 1 mm.

The NFHS still allows circular, triangular or square crossbars. See Rules 7-4-6 and 7-5-11 for the allowable dimensions. **NOTE**: Starting with the 2013 season, only circular crossbars will be allowed.

3. Weight. IAAF, USATF and NCAA specify a ***maximum*** of 2.0 kg for HJ crossbars, and 2.25 kg for PV cross bars. NFHS specifies a ***maximum*** of 5 lb for all HS crossbars.

Some crossbars are overweight, at least in part due to copious amounts of athletic tape wrapped on the ends. Excess tape should be removed. Also, if necessary, an overweight bar can be trimmed in length if it is longer than the required minimum.

4. Length. IAAF, USATF and NCAA specify the following length ranges:

HJ: 3.98 to 4.02 meters
PV: 4.48 to 4.52 meters

NFHS specifies the following:

HJ: 12 ft to 14 ft 10 in (3.66 to 4.52 meters)
PV: 14 ft 10 in (4.52 meters)

[The previous four inspection points are reasonably easy to perform. Crossbar sag also affects how the bar performs, but takes a bit more effort and care to measure.]

5. Sag: This is the amount the crossbar will droop when it's set up on the standards. IAAF, USATF and NCAA specify a maximum sag of 20 mm for HJ and 30 mm for PV crossbars. NFHS has no sag requirements.

Put either bar on chairs or on high jump standards. Set and check that both ends are at the same height and record that height. Then find the low point by visual inspection; it may not be at the exact middle of the bar. Measure the height of the low point. Subtract the height of the low point from the height of the ends. If the difference is greater than 20 mm for HJ or 30 mm for PV then find another bar.

If there are no spare bars, then the end pieces can be rotated so the bar is within specs. Normally the bar's max sag is desired at the bottom because that is the most stable position, but if it doesn't conform then you have to rotate the ends.

Please do not use tape on the ends unnecessarily. If the end pieces are too loose, take them off and put a little tape (not a full wrap) on the bar and replace the ends. They won't rotate then. Make sure to mark the ends and bar so it is always replaced on the standards the same way.

6. End pieces. Details of the end pieces are not covered here; see the applicable rule book.

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Feeler gauge for javelins

An easily overlooked javelin rule concerns the straightness of the profile.

IAAF Rule 193.5 says, in part, "*The longitudinal profile from the grip to the front tip and to the tail shall be straight or slightly convex, and there shall be no abrupt alteration in the overall diameter, except immediately behind the head and at the front and rear of the grip, throughout the javelin.*"

Note (ii) to this rule further explains the concept by recommending the use of a 50 cm long metal straight edge held firmly against the side of the javelin. If the javelin's profile at that location is slightly convex, the straight edge will rock back and forth. For straight sections of the profile, it must be impossible to insert a 0.20 mm feeler gauge between the straight edge and the javelin. This also applies to the profile of the head, where this rule guards against heads with an hourglass profile.

A 0.20 mm feeler gauge is available at a very nominal cost from www.mcmaster.com as part number 2283A9.

This same rule also sets the maximum diameter difference between the rearmost part of the head and the javelin shaft just behind the head at 2.5 mm. While this can be checked with a 1.25 mm feeler gauge, it is just as easily checked as two diameter measurements with a caliper at those two locations, which cannot differ by more than 2.5 mm.

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Javelin profile inspection reference

Most inspectors are familiar with the profile requirements:

- 150 mm aft of tip*: $\leq$ 80 % of max diameter ("D0")**
- midpoint between tip and CG: $\leq$ 90 % of D0
- just forward of grip: D0**
- grip: no more than 8 mm more than D0
- aft of grip: no more than D0; no less than D0-0.25 mm
- midpoint between tail and CG: $\geq$ 90 % of D0
- 150 mm forward of tail*: $\geq$ 40 % of D0
- tail: 3.5 mm minimum

* 125 mm for 400 g javelins

** see rule book maximum diameter specs for all five javelin sizes (identified as "D0" in the IAAF rule book).

This article concerns the profile points where the 80 %, 90 % and 40 % measurements are made. Ideally, D0 is measured with calipers and the ratios are calculated. Then those profile points are measured with calipers and the results are compared with the calculated values.

This can be a cumbersome process when every ratio is computed with a calculator. An alternative is to use a pre-calculated reference sheet. The concept is not new. Here is one such sheet that can be freely used, and modified as needed: http://home.comcast.net/~ikstrums/Javelin_profile_dimensions.xls. It is formatted to print on two sheets.

Page 1 contains the ratios for all javelins, except the 700 g. Values for the roundness spec are also provided. Page 2 covers the 700 g javelin.

Measure the javelin diameter with a caliper just in front of the grip cord (D0) in three orientations. A few javs will be exactly round, but most will not. A small ovalness is acceptable (max 2% difference between the largest and smallest measured diameters). Mentally calculate the average of the three and compare with the Max Diameter spec.

Then check the Javelin Profile Dimension table. For the given javelin weight, drop down the left D0 column to the average diameter that was just calculated. The columns to the right provide the 80 %, 90 % and 40 % measurement limits for the profile. Also provided are the 2 % max ovalness values of D0.

While on this subject, the most complete table of javelin specifications is found in USATF Rule 193.7, since it covers the full range of 400 g to 800 g javelins. However, anyone who works Masters meets knows that look-up errors can easily be made with this table, due to the number of rows and columns. Another presentation is available at the following link, which is more grouped and visual:

http://home.comcast.net/~ikstrums/Javelin_measurement_guide.gif

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Hammer lug failure

Pictured below is a broken hammer lug. The lug is where the wire attaches to the swivel on the head. This joint can experience up to ~850 lb tension when thrown by a world-class athlete. On occasion, a lug will fail, usually due to previous damage incurred, such as during a collision with a throwing cage stanchion.

Time permitting, it's a good idea to look at the hammer lugs for hairline cracks or necking of the material. Such conditions will lead to failure of the lug during a throw.

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Discus rim thickness

Rim thickness is one of the central specifications that define a discus. It directly affects the "feel" of the rim by the fingertips. The thickness of the rim is specified at 6 mm (approx. ¼ inch) inside the outer edge of the rim.

The allowable thickness range is 12 mm to 13 mm for the 1, 1.5, 1.6 and 2 kg discuses. It is 10 mm to 13 mm for the 750 g discus.

[**Note**: These specs are per the IAAF, USATF, NCAA and WMA rule books. The NFHS rule book continues to specify a singular 12 mm thickness, which would technically disqualify almost every discus in use. Recent attempts to change the NFHS rule to match the other books have not succeeded. In spite of that, inspectors are advised to apply the 12 mm to 13 mm range spec to high school discuses.]

The simplest way to measure the rim thickness is by use of a notch that is either machined or laser-cut in a piece of sheet metal, preferably stainless steel. Discus measurement templates, such as those made by Gill Athletics, UCS and (previously) Trackmaster, include the minimum and maximum thickness notches.

First and foremost, a discus rim should *never* be rotated within the inspection notch. This will quickly wear the upper edges of the notch, thus widening it and making it unsuitable for further use. Instead, do the following:

1. Place one point of the rim ***perpendicularly*** into the minimum thickness notch. Most of the time, the rim will ***not*** touch the bottom of the notch. If the rim does touch the bottom of the notch, try rattling it back and forth. If there is no movement, the rim is still legal (being at exactly the

minimum thickness). If there is movement, the rim thickness is less than spec.

2. Place the same point of the rim perpendicularly into the maximum thickness notch. Most of the time, the rim ***will*** touch the bottom of the notch, which is required. If the rim does not touch the bottom of the notch, the rim thickness is greater than spec.

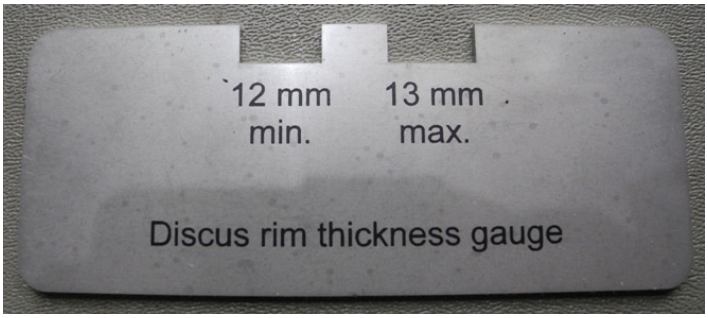
3. Repeat the above at three other, equally-spaced points along the rim. If three of four measurements are legal, pass this check.

INCORRECT
Rotating a rim in the notch, or dragging the notch over the rim will quickly wear out the notch.

CORRECT
Place the notch in to the rim.

In the event that your inspection templates have worn-out thickness notches, or you have older templates that are missing one of the notches, replacement templates should be obtained.

If you access to a machine shop, have the notches machined in ¼" plate steel or aluminum. A thicker plate is ideal because it helps keep the template perpendicular to the discus. If this is not an option, laser-cut Discus Rim Thickness Gauges can be ordered from http://www.terrene.biz/ at 800-513-5416. 14 gauge (0.078 inch) stainless steel is recommended for durability.



Twisted measuring tapes

Over the course of a throws or jumps flight, measuring tapes will sometimes get twisted. This can be due to the tape puller constantly turning the reel while handling it, or the wind spinning the tape, particularly in the long throws.

Are twists in the tape detrimental to a distance measurement? How much is tolerable, and how much is detrimental? We decided to find out.

A 100 ft Komelon tape was tested over a 40 ft length to simulate a typical SP or TJ distance. And a 100 meter Komelon tape was tested over a 200 ft length to simulate a long throw. These two tapes had been tested for accuracy last summer (see Newsletter 21-2) and found to be accurate.

For this test to be meaningful, the tapes needed to be tensioned very consistently. This was accomplished by using the same force gauge as was used during the tape calibration test. A force of 20 newtons was applied for every test condition since the Komelons are fiberglass tapes.

One person held the 40 ft or 200 ft mark lined up with a reference on the floor. A second person was positioned at the tape's half-way point to perform the twisting and shaking the tape to ensure the twists were evenly distributed. A third person attached the tape's zero point to the force gauge and tensioned the tape.

In both cases, the tapes were reeled out flat and tensioned to 20 newtons. A metric ruler was indexed to this "zero" point and taped to the floor.

Then ten half-twists were applied to the tape's midpoint. This was judged easier than turning one of the ends. The tape was lightly shaken to ensure the twists were distributed down each half of the tape. The tape was tensioned twice to 20 newtons, and the shortening of the tape, relative to the zero point, was recorded. This was repeated with 20 half-twists for both tapes, and 30 half-twists for the 200 ft test.

Note: A half-twist at the midpoint is the same as a whole twist at one of the ends.

Results:

	Amount of tape shortening	
# of half-twists	40 ft tape	200 ft tape
10	2 mm	3 mm
20	9 mm	5 mm
30	---	10 mm

These results suggest that some twists are virtually non-consequential. A large number of twists are required before the measurement is significantly affected. Therefore, it appears that straightening out a tape between flights should be adequate in most cases.

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Removing shot plugs & hammer swivels

On occasion, the plug must be removed from a spun shot, or the swivel must be removed from a hammer head for maintenance or repair. Two tools are very helpful in accomplishing this task: a spanner wrench and a chain grip.

Hammer heads and spun shots have plugs that thread into the ball. These plugs usually have a pair of small holes or slots that require a spanner wrench of the correct shape and size. Adjustable spanner wrenches are the best because the spacing between the holes varies by manufacturer. In the editor's experience, the most common hole sizes require spanner wrenches with 2.9 mm, 3.8 mm and 4.8 mm (3/16") pins. Candidate tools include part numbers 5481A1, 5735A11, 5735A12 & 5735A13 (catalog page 2765) from www.mcmaster.com. These particular spanners are German-made (Gedore) and take a fair amount of abuse.

On occasion, the spanner holes on a hammer swivel are too close to the lug so that a typical spanner wrench will not fit. In these cases, snap ring pliers are the next best option. However, most snap ring pliers are designed for a fairly light load and may break when trying to remove a hammer swivel. Heavy duty snap ring pliers, with 90° tips, are made by Knipex. Models 44-21-J31 and 44-21-J41 are of appropriate size for this task. Their www.mcmaster.com part numbers are 5449A87 and 5449A88, although they're available elsewhere, as well.

Polanik hammers and weights require special swivel wrenches. These are available from M-F Athletic and were previously mentioned in Newsletter 20-2.

Once in a while, a shot will turn up with a large slot in its plug. These slots are longer than any normal screwdriver tip. And they are too narrow for use with a drag-link socket. The editor has not been able to find any commercially-available tools to fit such slots. The best interim solution has been to use screwdrivers with the widest tips that can be found. The Ultra-Grip Steel-Head Screwdrivers on www.mcmaster.com page 2834 have wider-than-normal tips for this purpose. These screwdrivers also have hex shoulders next to the handle for a cheater wrench, which increases their usefulness.

Once the correct spanner is at hand, a means of holding the shot or hammer head must be found. It is usually not enough for an assistant to hold the ball against the torque generated by the spanner wrench. This is where a chain grip or chain clamp is very handy. A variety of chain grips are available, but one is particularly well-suited for this purpose: The Vice-Grip 20R. This is a locking tool and can easily wrap around a 130 mm diameter shot.

A strap wrench is useful with softer metal implements or where leaving scratches is not desired. The strap should be 18" long to fit 130 mm shots or hammers.

It is recommended that one person holds the chain grip while another twists with the spanner wrench.
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Not all plugs will come out. Some shots have been beat up sufficiently that their plugs are somewhat melded to the balls. Heating with a torch may or may not help in such cases. Otherwise, penetrating oil may help clean out the threads.

Many hammers have a small set screw that holds the swivel from getting loose. This must be removed first. Since these set screws can be either metric or English, you'll need both types of Allen (hex) wrenches. One way to accomplish this is with hex key sets, like those pictured here. They also have sizes for indoor weight clevis pins and discus plates.

Once the hammer swivel is loose, mark the location of the set screw hole so that the swivel gets rethreaded starting at the same point. Otherwise it might be threaded back in, only to have a high plug or a low plug to the hammer head surface, needing to be rethreaded again.

One last note. Spanner holes in shots are frequently packed with dirt. A small awl or pick is needed to clean them out. However, sometimes the dirt is packed and baked to almost the consistency of cement. It will take several minutes to clean out with an awl. A cordless drill is a faster solution. ***However,*** if you use a drill to clean out spanner holes, please observe the following: (1) pick the drill bit carefully to match the spanner hole (same size or smaller); do not use a larger size, and (2) do not drill the hole any deeper than it already is. A dull drill bit will probably work the best.

Tool collection for working on shots and hammers

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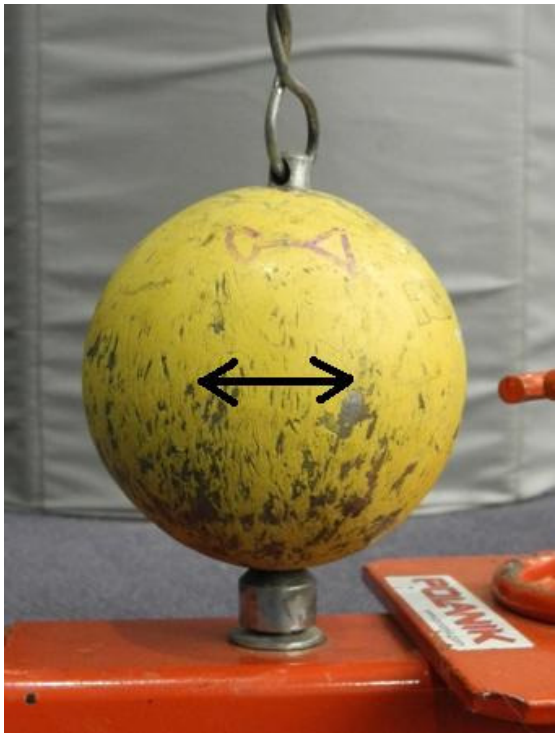
Hammer cg measurement

All rule books require the center of gravity of the hammer head to be within 6 mm of its geometric center. This is most easily checked by placing the head on a 12 mm orifice: If it stays on, it's legal; if it rolls off, it's illegal.

When performing this measurement, the orientation of the head on the orifice is critical. If the head is placed on in a vertical orientation, then the a lateral CG offset is being checked. But a lateral CG shift is of no advantage to a thrower.



NOT a useful measurement
This checks the lateral CG offset, which is not an advantage to the thrower
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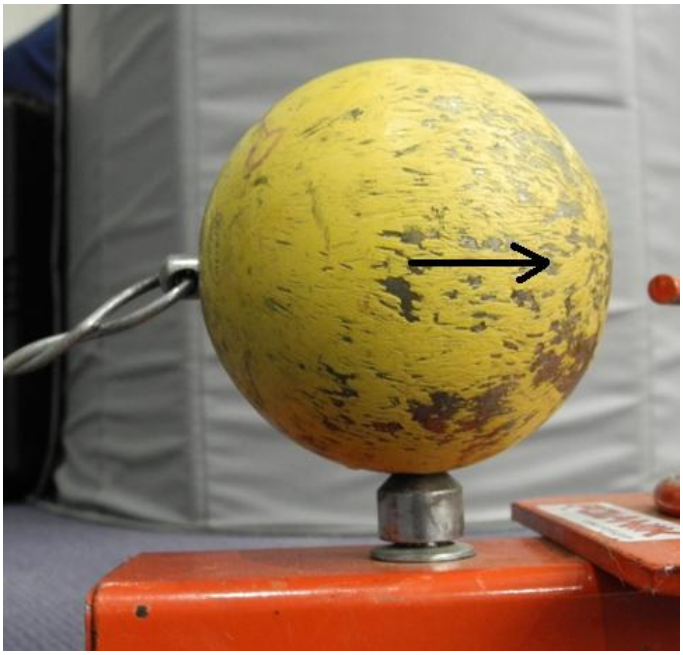
However, if there is an axial CG offset toward the bottom of the head, then the hammer will have more momentum during the swings. And this will create unfair advantage. Therefore, all hammer CG checks must be made with the head in a horizontal orientation.



Correct CG measurement
This checks the axial CG offset. If the offset is toward the bottom of the head, it's an unfair advantage to the thrower.

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DOCUMENT LINKS

Past **EFSS newsletters** are located at:
http://www.usatf.org/groups/officials/newsletters/

The **Implement Inspector's Handbook** has been revised for 2012 and will be available soon at the bottom of this page:
http://www.usatf.org/groups/officials/resources/field-events/

The **Implement Specifications Best Practices** has been revised with the new IAAF Youth change and will be available soon at the bottom of this page:
http://www.usatf.org/groups/officials/resources/field-events/

Implement Specifications (alternate format; revised):
http://home.comcast.net/~ikstrums/Implement_Weight_vs_Age_Charts_Rev_G.pdf

Ultraweight throwing square drawings:
http://home.comcast.net/~ikstrums/uw-throwing-square-dwg.pdf

Cleaner & Solvent Test results, Part 1:
http://home.comcast.net/~ikstrums/cleaner-solvent-test-01dec09.pdf

Cleaner & Solvent Test results, Part 2:
http://home.comcast.net/~ikstrums/cleaner-solvent-test-part2-30sep10.pdf

Implement Inspection Form/Impound Record:
http://www.usatf.org/groups/officials/files/resources/weights-and-measures/WMClinic-AnnualMeeting2010-ImplementInspectionForm.pdf

W&M Clinic Handout - Annual Meeting 2010:
http://www.usatf.org/groups/officials/files/resources/weights-and-measures/WMClinic-AnnualMeeting2010-Handout.pdf

Electronic Measurement resources:
http://www.usatf.org/groups/officials/resources/electronic-measurement/

Zeroing Standards and Pit Setup (Best Practices):
http://www.usatf.org/groups/officials/files/resources/field-events/Pole-Vault-Zeroing-Standards-Pit-Setup-Aug2011.pdf

Hurdle Placements and Heights (Best Practices):
http://www.usatf.org/groups/officials/files/resources/track-events/Hurdle-Placement-Heights-Feb2011.pdf

LDR & XC Chute & Finishline Layout:
http://www.usatf.org/groups/officials/files/resources/long-distance-running/chute-finish-line-layout.pdf
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