

History and Testing of the St. Artemas Raminwood Nock



Inga's Method

By Ingilborg Sigmundardottir of Caid.

*(Thanks to Baron Eadric of Mansfield,
John of Sutherland, Sir Drogo FitzWilliam and
THL Tessa the Huntress for their assistance)*

The St. Artemas nock was designed and developed by the archers of the College of St. Artemas (Barony of Calafia, Kingdom of Caid) for use on golf tube and Siloflex arrows using tennis ball tips.

History

The Guardians of St. Artemas developed the St. Artemas nock circa 1997, as an anti-bounce back device for golf tube arrows in use at the time. After a year or so of in-Kingdom testing, the nock was approved for use by Sir Edric Aaron Hartwood, Caid Earl Marshal, and THLady Morgan the Fellwalker, Caid Deputy Earl Marshal for Combat Archery. During testing the nocks exhibited no failures of any sort, and suffered only minor damage (dents to the surface).

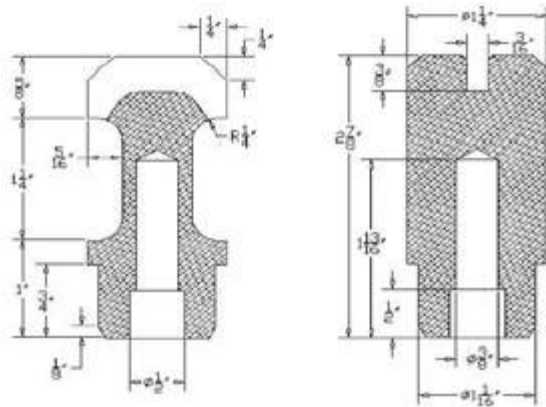
A few years later, THLady Morgan the Fellwalker allowed the use of the same nock design on Siloflex, which was just coming into general use.

St. Artemas has roughly 300 of these Siloflex/Ramin nocks in their inventory currently. These have been used heavily in Caid since their inception (Caid has four intra-Kingdom wars a year, all of which allow combat archery in all battles, plus Great Western War and Estrella, which allow archery in some of the battles). It is impossible to know how times these arrows have been shot since their inception but a guesstimate would indicate around two thousand shots easily ((Five St. Art archers per battle) times (five arrows per battle) times (five battles per war) times (three wars a year) gives a conservative estimate of 375 shots per year, for over five years. This does not include practices, which probably double that number per year). In that time, no failure of the nocks has occurred, and no nock has been withdrawn from service.

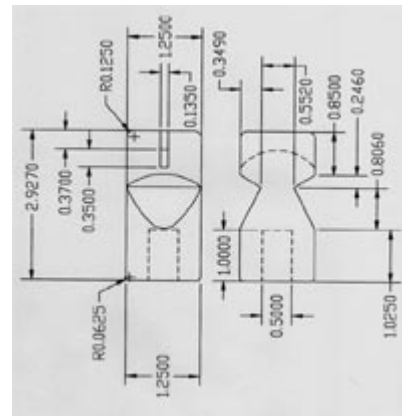
In 2003, Lady Ingilborg Sigmundardottir petitioned for the Saint Artemas nock to be approved at the Society level. After formalized testing was done and results submitted, the Saint Artemas nock, both the golf tube and Siloflex version, was approved at the Society level by THL Tessa the Huntress on October 8, 2004.

Design

The nock is a cylindrical piece of wood, the exposed portion being flush with the surface of the arrow shaft. The Siloflex model nock is rebated on one end to inset into the shaft with a tight fit. Opposite sides of the exposed nock are notched for finger grips, and a string slot is cut into back end to receive the bow string. Some material is removed from the center of the shaft end to lighten the nock.



(Thanks, Brun Canutteson! Siloflex version shown)



(Thanks, Carolus von Eulenhorst! Golf tube version shown.)

Material

The body of the nock is turned from a solid piece of Ramin wood (*Gonystylus*), a straight-grained tropical hardwood. In the very early stages of development of the Saint Artemas nock, other types of wood such as pine, oak, poplar, etc, were tried and found to be unsatisfactory.

Assembly

On the Siloflex model, the rebated end of the nock slips into the rear of the arrow shaft and secured with glue, or is drilled in a cross configuration and tied or sutured in place. The golf tube version is treated in a similar fashion. The junction of nock and pipe is covered with a very thin strip of duct tape to protect the edge. The nock itself is never taped or covered in any way, to make the condition of the nock more observable.

Testing

It is easily observed that the nock as built cannot fit into a grill opening. The nock would have to be dramatically (and very noticeably) damaged, along its entire length, to penetrate into a one inch gap. Even a nock separated from the arrow could not penetrate, as no aspect of the nock is less than one inch wide. Only if the nock broke, could some portion of it enter a helm. So tests were designed to see what impacts could cause the nock to break, and the likelihood of such impacts occurring. Consequently, testing of the nock itself focused on three primary scenarios:

1. Creating and analyzing worst case failure of the nock itself (Tests 1a and 1b)
2. Creating and analyzing possibilities for an arrow flipping in flight (Test 2)
3. Creating and analyzing bounce-back impact by the nock end (Test 3)

Additional testing was needed to see if a tennis ball tipped arrow using the St. Artemas nock would hit a fighter unacceptably hard. Two sets of tests were undertaken to this end, one set versus fighters wearing SCA minimum armor and one set versus helms to check for material damage to the helms (Tests 4 and 5, respectively).

Finally, a design change to the manner in which the nock is held in the shaft was required. The metal staples which had been used in earlier designs was deemed unacceptable, and so testing was performed on an alternate attachment system (Test 6)

All test results include bow poundage, arrow length, firing distance and angle of impact.

Test 1: Nock Structural Failure

This series of tests was designed to provide data on how the nock might fail, how fast the nock might fail, and how observable the damage would be to the eye. This series of tests had two components.

In the first series of tests (1a), test arrows were built from a Siloflex shaft, with St. Artemas nocks attached to each end. The test arrow was then fired from a fifty pound SCA hand bow at various targets. The goal was to stress test the nock, to failure if it occurred, and view the progression of damage the nock would display.

Two sets of tests were performed for these series in January and February of 2004. The first set was performed by Ingilborg Sigmundardottir of Altavia. She made three of the test arrows (with staples) and using a concrete wall as a resistant target she fired the three test arrows until they were unusable. To summarize, shots one thru four for the test arrows typically resulted in crushing of the wood nocks, and some minor flaking of the wood along edges. Further shots drove the nocks into the Siloflex tubes, which expanded but didn't split.

The second set of tests in this series was performed by Ungust fillius Antonii of Lyondemere. These test arrows had only strapping tape holding the nock in place. He fired a series of six test arrows at five SCA helms, all with a grill of round bars, as helms with eye slots were

not available at the time, and per Caidan standards cannot have a greater than one inch wide opening (must have bars behind the oculars). The shots were made from a 49# bow at a distance of 5 feet. He fired six shots at each of the helm grills, and with the exception of one impact, the nocks sustained only surface dents. In the exceptional case, the nock hit a grill bar directly on the string notch. The nock split along the notch (in line with the grain), allowing the nock to penetrate roughly a half inch deep into the grill (beyond the inside surface of the bar). The nock remained attached to the Siloflex shaft, being held by both the edging tape and outward pressure of the nock.

The second test (1b) was designed to see what sort of damage the nock might receive by being trampled underfoot or being generally abused on the battlefield.

Please refer to the report of Estrella 2004.

Test 2: Arrow Flipping and Direct Impact

A possible risk would be that of the nock destabilizing an arrow, allowing the arrow to deliver the nock end to a target. This series of tests had two components.

The first was to build tennis ball tipped arrows using the nocks, and making repeated firings to see if the arrows would fly consistently point first. This would indicate how likely the possibility of an arrow flipping in flight would be.

The second was to test the possibility and result of a nock leaving an arrow after firing (due to an attachment failure).

This test was not formally completed. Anecdotal data was used. It was found that counterboring of the nock to decrease the weight to an average of 20 grams (about 3/4 of an ounce) is essential in order to properly balance an average tennis ball, which weighs 2 ounces, as the arrow blunt. The Saint Artemas nock was found to be unacceptable when trialed with rubber stopper foam (aka Omarad) blunts, which have an average weight of 20 grams (about 3/4 of an ounce). Saint Artemas nocks when used with rubber stopper foam (aka Omarad) arrows caused unacceptably high rates of arrows laterally sailing or "taildragging" in flight.

Attachment failure: At Estrella 2004, it was ordered by THL Tessa the Huntress that all Saint Artemas nocks that had been stapled to Siloflex shafts have their staples removed. This was done. Arrows belonging to the Guardians of Saint Artemas were glued in place and taped as a temporary measure until they could be drilled and tied. At the conclusion of the first battle, it was discovered by a senior combat archery marshal that some of the nocks had been merely friction fitted in place and not glued. These nocks had been used in a battle and had not come off. The original inspecting marshal had tested the fit the morning of the battle by pulling and had not noticed the nocks had been merely friction fitted due to the tightness of the fit.

Test 3: Bounce-back and Indirect Impact

Finally, a possible risk would be that of a standard arrow bouncing back from a primary target, and delivering an impact nock-first against a secondary target.

A set of tennis ball tipped arrows using the nocks were shot against a target at various ranges, attempting to create a bounce-back into a secondary target.

<Results TBD by St. Art testers>

Test 4: Impact Testing on Fighters

A series of tests were performed by Ingilborg Sigmundardottir and Ungust fillius Antonii where fighters wearing minimum SCA armor were struck by tennis ball tipped arrows using the nocks, in a manner consistent with their use in combat. Arrows utilizing both the golf tube model and the Siloflex model were used and the tests were run separately. Shots were taken at the fighter's backs, to help isolate the effects of the impact. The fighters were asked to rate the impact on a scale of 1 to 10: 3 being a recognizable blow, 5 a definite hit, 7 being 'a killing blow', and anything above 7 being excessive or painful. Five fighters, of varying experience levels, were recruited to participate as targets.

The bows used were St. Artemas Mark V centershot handbows rated at 49 pounds and 45 pounds draw at 28 inches. The fighters were to be shot 15 times each, five shots at 30 feet, five shots at 20 feet, and five shots at ten feet. Fighters could discontinue the testing at any point if they chose.

To summarize the results, impacts by the arrows were well within safe and reasonable impacts, even against unarmored and sensitive areas, until the 10 foot range was reached. At that point, the subjective pain felt by two of the targeted fighters (back and butt shots) was deemed too unpleasant to continue. On the other hand, one fighter undertook the full cycle of shots without reporting excessive impacts, and two fighters received additional test shots at 'clear the bow' range (Caid minimum range) and did not report excessive impacts. There were no injuries.

These results indicate the subject arrows have only marginal (and not consistent) potential for excessive impact. Only shots against some unarmored locations on some individuals at close range using maximum bow poundage were deemed excessive. No actual injuries occurred.

Test 5: Impact Testing on Helms

The testing of the potential damage to a helm by a St. Artemas nock was done at the same time the destructive nock testing was done by Ungust (Test 1a, second set, above). Five helms were used in the test, all with bars and one also included an eye slot. The shots resulted in no noticeable damage to any of the helms.

An ocular style helm was to be included in the testing, but none was available. There are no specific rule variations in Caid for ocular style helms, and as the tested helms showed no damage, it would seem likely results would be the same for Caid-legal ocular style helms. Test 6: Mechanical Testing on Revised Nock Attachment Method

<Results TBD by St. Art testers>

Further details of testing can be produced upon request. Please contact Inga at ingawolf@argentlupus.com

Thanks to the following people:

Guardians of Saint Artemas

Master Quinn Phelan

Lady Mora de Buchanan

Baron Eadric of Mansfield

Sir Drogo FitzWilliam

THL Tessa the Huntress

THL Carolus von Eulenhorst

Brun Canutesson

Happy Combat Archery!

The Author:

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Ingilborg Sigmundardottir is an 11th century Norsewoman. Her husband died long ago on a campaign, and her fair daughter sailed away on a longship to be wedded to a brave Viking prince. She spends her crone years as an accomplished healer, birthing the babies of her village and tending wounded warriors of all types. She contemplates the White Christ, whose teachings she finds sensible and fascinating. She is known as a very accomplished archer, meadmaker, and Healer. She lives away from her village in the surrounding forest and is rarely seen among the villagers, but is intensely loyal to them and offers the services of her bow whenever her village is threatened. Her cottage is rich with plants of all types and she keeps the company of wolves, and the wiser of the villagers know that in times of extreme, she is quite capable of running with them whenever necessary.

Roberta Ashley is a 21st century Norsewoman, a very accomplished anesthetist who is all too often seen in the hallways of various healing institutions in the City of Angels, where she assists in the birthing of babies and the tending of wounded warriors of all types. She is an accomplished archer, meadmaker, and practices in her spare time a very ancient form of Eastern hands-on healing when it is needed. Her cottage in the more remote canyons of the San Gabriel Mountains is rich with plants of all types and she keeps the company of two rescued captive bred wolves, Cheyenne and Mai-Coh. The wiser of her colleagues know that in times of extreme, she is probably quite capable of running with them whenever necessary.

