SNOAR NEWS

JANUARY 1987

THE LEADER IN SPACEMODELING

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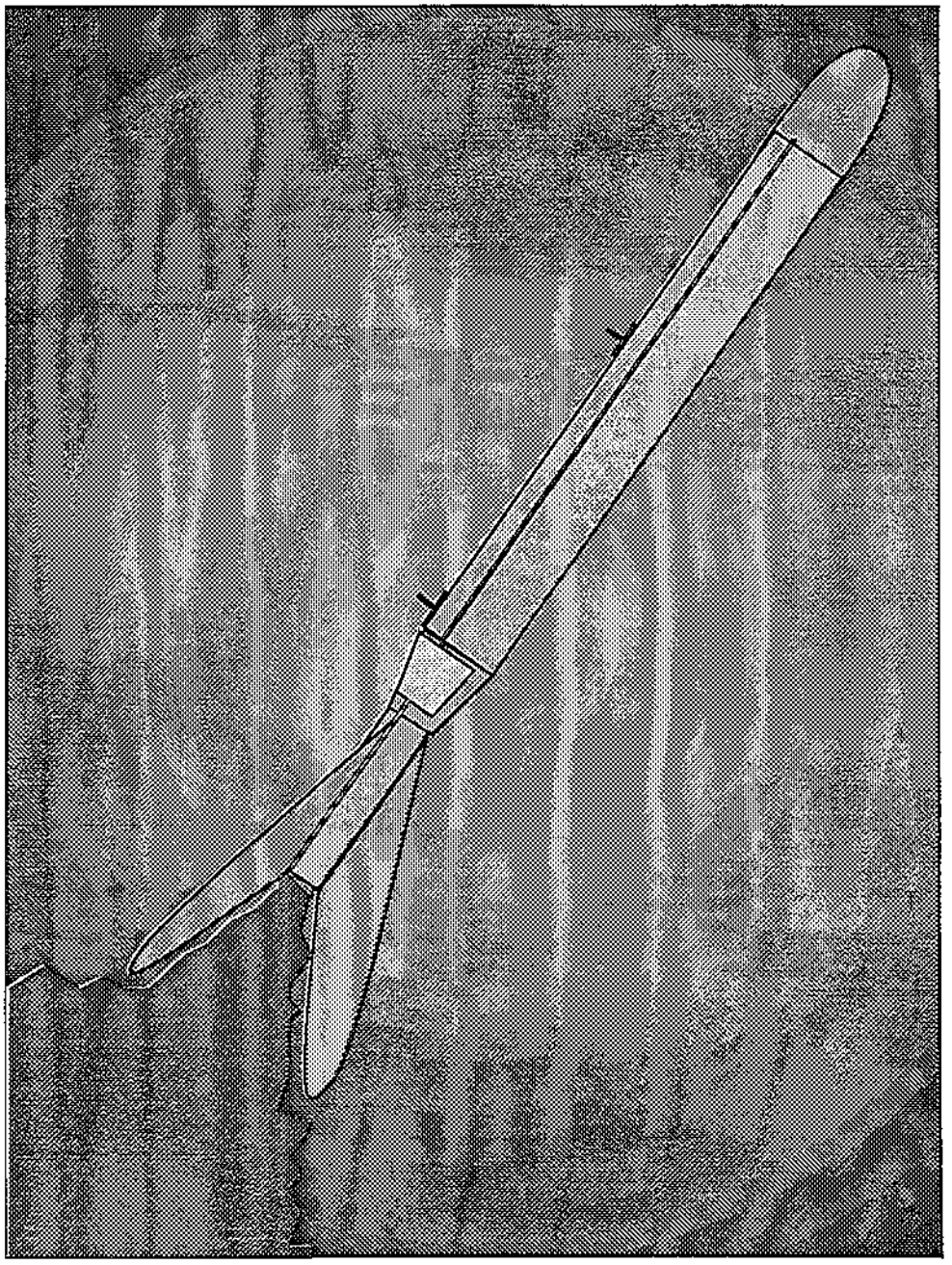
INTERNATIONAL STREAMER DURATION!

EXCLUSIVE! Plans for Pavlov's Gold Medal Streamer Duration Bird!

Tales of International Intrigue!

Roll Your Own Body Tubes The Easy Way!

A New Contest!



SNOAR NEWS

THE LEADER IN SPACEMODELING

ROCKETRY'S LONGEST PUBLISHING, MOST CONTROVERSIAL NEWSLETTER

VOLUME XIII, NUMBER 1

QUOTABLE:

"I understand that Jerry Irvine has quite a following in California." - Ken Hubal
"Yeah, and so did Charles Manson..." - Chris Johnston

COVER STORY:

We go overboard this month on international streamer duration! See the plans for Jordan Pavlov's gold medal bird, and Whoopi Goldberg's Real Life Rocket Adventures.

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IMPORTANT STUFF:

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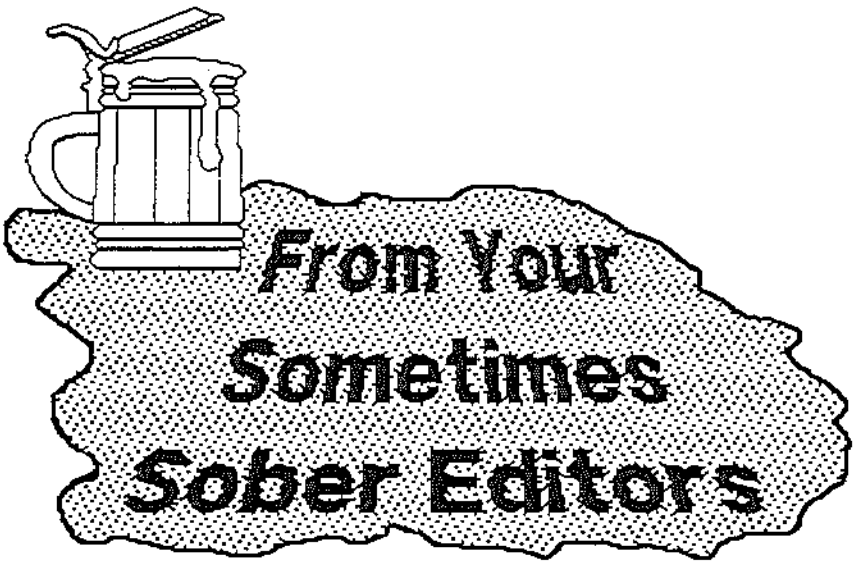
THIS JUST IN! Tony Williams, SNOAR NEWS's foreign correspodent in Beruit, has not been heard from in over six weeks.....



A Significant Victory!

The spring of 1987 will see a substantial change in the hobby of model rocketry. For the first time, models weighing up to 1500 grams and powered by no more than 125 grams of propellant will be flown by NAR rocketeers at NAR sanctioned events with NAR insurance. This is an amazing event in light of the NAR's resistance to high power as few as five years ago!

The move to raise the weight limit and propellant limit is a significant victory for all rocketeers. It has shown that the NAR has been transformed from a petty, insignificant self centered bureaucracy to a vital, politically active organization that has the foresight and courage to challenge the status quo. Instead of bickering about censorship in the Model Rocketeer, the NAR is now actively advising the Department of Transportation, the NFPA and the FAA as to how the hobby should be best administered. In short, the NAR is looking for it's members' best interests in many ways. The change in the safety code represents the most significant change in the hobby since its inception.

How did this come about? Small pockets of interest in high power were generated in California, Texas, Pennsylvania and Ohio in the late 1970's. But that interest was nothing more than a local phenomena until Tom Kolis sent films of a high power activity in California to Kentcon in 1979. With a lot of enthusiasm transplanted in the midwest and east, truly a national movement began to take place. High power sports meets, such as LDRS, began to attract a large number of flyers and spectators. At the same time, the NAR began to mature in its leadership after undergoing some tough times. The NAR, for the first time, began to realize that it could be a powerful organization if it took advantage of the opportunities that lay before it.

There are a number of people and organizations who have paved the way to these changes. Certainly rocketeers like Warren Sisco, Korrey Kline, Tom Kolis, Roger Johnson and Chris Pearson first kindled the enthusiasm for high power. Magazines such as the now defunct California Rocketry and High Power Research also spread the word from coast to coast. NAR President, J. Pat Miller was instrumental in developing and implementing the strategies that allowed changes to take place in the hobby. Trip Barber, Harry Stine, Vern Estes, Dane Boles, Gary Rosenfield, Scott Dixon, *(text continued on page 17)*

THE HEAT SEALING METHOD FOR ROLLING BODY TUBES
Or,
"Rolling your Own Made Easy"

By Randall Redd

(Editor's Note: This report was awarded second place at NARAM-28)

OBJECTIVES

The purpose of this research was:

1) To find out which commonly available household glues posses the property of "heat sealing," which is to bond separate surfaces together by applying heat and moderate pressure after the glue has already set up or dried in the traditional sense.

2) To determine which glues could be used in this manner to roll body tubes in a way to eliminate some problems encountered using the wet glue method presently used.

3) To make and test tubes with this method to determine what advantages they may offer over wet rolled tubes or commercially available tubes.

4) To develop techniques for hot rolling body tubes that will allow any rocketeer to roll their own tubes that are stronger, lighter, and for cheaper than those sold commercially.

INSPIRATION

Three or four years ago a report written by Mark Bundick in the Model Rocketeer described how model airplane hobbyists were attaching commercial airplane coverings to wing ribs by coating the ribs with tite bond aliphatic resin glue allowing it to dry and thin bonding the covering to the ribs with a hot iron. The explanation given was that the heat activated the glue molecules into forming long chain chemical polymers with the covering material for an instant bond. This was the key idea that stimulated this research project.

BACKGROUND

There has always been interest in hand rolling body tubes. Unfortunately very little useful information has been published previously on this subject. William Roe published a NARTS Report in the early 1960's explaining how to roll body tubes using an apparatus attached to a lathe. This report recommended making tubes using 100 pound card stock wrapped 4 layers thick. These tubes would be very strong indeed, but also very heavy. He also wrapped his tubes around a professionally machined metal mandrel with a groove tooled into it. This would be impossible for most people to obtain and would be quite expensive. The glues he recommended were professional book binders cements and again would be difficult for most rocketeers to easily obtain. A young child reading this report could easily believe that tube rolling was very expensive, required machinery and needed special papers and glues. It has since become evident that such is far from the truth.

Carl Kratzer published the best description of how to roll cardboard body tubes by hand in Model Rocketry Magazine in 1970. He again recommended using 110 pound tagboard or 125 pound bristol stock and

bookbinding cement because it doesn't shrink on drying. His methods represented the state of the art for wet rolled parallel wound body tubes from then until now.

The other type of cardboard body tube made by hand is the spiral wound body. John Pollock described how to make them in Model Rocketry Magazine in 1969. His method involved wrapping gummed package sealing tape in opposing spirals. There really have been no advances in the art of rolling body tubes since that time.

WET ROLLING METHODS

I have reviewed Roe's, Kratzer's and Pollock's methods and have made some general observations about the wet rolling of body tubes. The cardboard stock used needs to be thick, at least 90 pound stock (weight of 500 sheets in a 24" x 36" size). Anything thinner tends to weaken and tear or distort badly when wet. The stock must at least be able to expand and contract uniformly when wet. This makes thin walled, light weight body tubes practically impossible. 5" x 8" file cards are readily available and make adequate 8" x 3/4" tubes.

The mandrel or cylinder used to wrap the tube around must be the same outside diameter as the desired inside diameter of the tube to be rolled. The Estes BT20 and BT50 with their inside diameters of .707 and .950 proved difficult to find mandrels of the proper diameter to allow imitation. Wooden dowels of 3/4" or 1" size were slightly bigger requiring internal engine tubes or lots of masking tape to mount engines in tubes made from them. This also meant more weight and drag on the model which discouraged many would be tube rollers. A fairly satisfactory method I have developed for rolling BT20 and BT 50 sized tubes involves wrapping several expended engine casings end to end with strips of 2" wide cellophane package sealing tape and using this for a mandrel.

If glue gets on the mandrel it can glue the tube in place permanently and ruin the mandrel if it is wooden or cardboard, and certainly ruin the tube. Metal or plastic mandrels can be picked clean and used again if this happens, but the tube is always a loss. This problem is what makes wet rolling tubes an art.

The most critical moment in any tube rolling operation is the moment that the paper catches as it makes its first complete turn of the mandrel and sticks to glue on the next layer of paper. The paper should not have glue on it in the area that will touch the mandrel but should have glue on the rest of that surface. On a 5" wide piece of stock glue only goes on the last 2 5/8" for a 2 layer tube around an approximately 3/4" mandrel. If the edge of the glue is too close to the dry edge of the page the glue will stick to the mandrel. If the edge of the glue is too close to the wet side of the page a large unglued overlap will be inside the tube when it is done or a weakness may result if there is not two full wraps of glued stock.

A very precise line must be drawn to show where glue should not be. It is usually one full mandrel circumference plus a little safety margin determined by the nerve of the roller.

Right: Author Randy Redd with his F BG model at NARAM-28

The width of the stock is usually 2 or 3 or more circumferences plus an "undesirable overlapping margin again determined by nerve.

The paper must be tight against the mandrel in all places or the tube will be too fat, or slightly conical, or the stock will buckle as it is rolled, or glue will get to the mandrel again. Reo tackled this problem by tucking the stock in the grove tooled into his mandrel. Kratzer used tape to hold the tube edges down. Another technique involves curling the stock around a table edge or rolling it around a smaller tube so it will tend to tuck under the roller rather than stick out into the glue as it comes around. Thicker stock is harder to get to tuck in properly. Lots of fingers at proper intervals help insure that the stock is tucked properly down the whole length of the tube. This tucking is a severely limiting factor in parallel tube rolling. Stock can be obtained in 36" lengths but it is impossible to get that much stock tucked in at just the right spot without it coming untucked at another spot. 18" lengths are just about the absolute maximum that can be rolled successfully by one person.

The proper amount of glue to apply is another sticky problem. If too little is applied it will dry to quickly and won't bond the stock together. If too much is applied it will run out the ends and the edge as rolling is completed. As it comes out the ends it can glue the tube to the mandrel. As it flows out the edge it tries to glue the outside of the tube to the work surface. Care must be taken to remove the excess glue without letting the tube unravel before the glue has set. This technique again is an art.

Many glues set up too fast to be usable for rolling tubes. Titebond dries very fast when applied in a thin film in addition to shrinking substantially while drying. Elmers dries much slower and doesn't shrink as much which as made it the glue of choice if bookbinding cements can't be obtained.

The limitations on tube length of paralleled wet rolling could be overcome in theory at least by spiral winding. Pollock suggests wrapping gummed paper tape around the form so that successive spirals just touch the edge of the previous spiral with no overlap. The ends are taped down and additional layers are added with spirals running in opposite directions to the previous layers (this gives better strength). On the first layer the gummed surface is facing out on succeeding layers it is facing in. This should give a strong tube with a uniform surface that could be finished nicely without the vertical seam seen on parallel wound tubes. The problem is that the second layer is applied wet and must be aligned precisely before the glue dries or it won't stick. The paper tears easily when wet, tends to curl as it dries and it dries very quickly. It is assumed that very few people have tried this method more than once.

APPROACH TO THE PROBLEM

From the previous review it seems evident that the major problems involved with we rolling body tubes center around the wet glue sticking to everything it touches and trying to get it to selectively stick where and when it is wanted. When I realized that glue could be made to stick again after it was dry I realized that most of the body tube rolling problems could be eliminated. If glue could be applied to the paper and allowed to dry before being handled then thinner papers could be used because the water wouldn't weaken the fibers. Glue would not run onto the mandrel, the work surface and the outside of the tube or the modeler's fingers. If the glue would only stick when heat was applied then surfaces could be aligned properly and precisely at the modeler's leisure. The possibilities for reviving the old art of tube rolling were enormous.

GLUE TEST

The first problem involved discovering which glues would bond to themselves under heat. A collection of commonly available household glues was made including titebond glue (yellow) and Elmers glue (white). A complete listing of glues and experimental observations is contained in the Glues Tested Table.

The main test involved applying glue to 3"x5" file cards, letting it dry, putting the glues together and covering them with a hot household iron for 10 seconds. A 3"x 3" square in the center of each card was coated with glue. This left the ends free to pull on to try to pull the cards apart once they were heated. Since hot electric irons are what model airplane coverings are applied with that seemed like an appropriate and convenient heat source to use. The electric iron was set at the cotton setting *(Text continued on page 8)*

BODY TUBE COMPARISON CHART

TUBE TYPE	WEIGHT BEFORE GLUE (grams)	WEIGHT AFTER GLUE (grams)	WEIGHT TO BREAK (grams)	WEIGHT TO SQUASH (grams)	STRENGTH PER WEIGHT (g/g)	COMMENTS
Estes BT20	N/A	4.71	498.04	1888.79	105.74	broke 1-2 " from end along spiral
Spiral wound, 2 layer	N/A	2.39	304.84	442.55	127.54	broke 3" from end
Construction paper, wet rolled, 2 layer	4.47	6.06	815.43	1422.35	134.56	broke 1.5" out from end
Construction Paper, hot rolled, 2 layer	4.47	5.57	790.59	1030.43	141.93	broke 2" out from end
Double strength paper sack grocery, 2 layer	4.20	5.15	782.31	1322.99	151.90	broke 2.5" out from end
Spiral wound 3 layer	N/A	3.81	580.84	994.54	152.45	broke 3 " from end
90 lb cardstock short grain 2 layer	6.22	6.84	1138.36	2454.59	166.42	broke 2 " from end could not squash
110 lb card stock 2 layer	6.94	7.57	1270.84	2266.91	167.87	broke 2 " out from end
90 lb cardstock long grain 2 layer	6.22	6.90	1323.28	2454.59	191.77	broke 2 " from end could not squash
Computer paper, 3 layer, ~20lb.	3.78	4.71	961.71	1182.23	204.18	broke 1 " out from end
Computer paper,2 layer,~20 lb.	2.68	3.32	829.23	334.91	249.77	broke 4 " out from end

Squash test consisted of a 2" length of tube. The Break (Cantilever) test broke an 11" length of tube. All parallel wound tubes were wound with the grain running lengthwise from an 11"x5" blank for 2 layer tubes, and an 11"x17" blank for three layer tubes. Spiral tubes were wound using 1.5" wide adding machine paper tape with layers in opposing spirals. Strength per weight = Weight to break÷Weight after glue. All tubes were heat sealed unless otherwise stated.

GLUE COMPARISON CHART

Glue Name	Wrinkling	Hot 1+0	Hot 1+1	Wet	Final Rank	Comments
Elmers Glue -All (White)	5	1	8	10	10	good bonding, some wrinkles but not bad
Tube O Tacky (white)	6	5	9	10	9	best hot bond, best cold bond, wrinkles somewhat, too thick to spread well surface lumps after seal.
Tight bond (yellow)	4	1	7	10	8	wrinkling on drying, glue was cut 50% with water good but only partial bonding
Clear Glue (for Styrofoam)	7	N/A	3	N/A	5	little bonding
Spray Adhesive (Contact Cement)	10	7	7	7	4	needs thick coat, sticks well 1+0, never gets non-sticky
Contact Cement (Water Base)	3	3	7	10	4	few wrinkles, good bond, never gets non-sticky
Rubber Cement	10	1	5	N/A	4	Release with constant pressure, not a real good bond, never gets non-sticky. Doesn't penetrate paper.
Mucilage	2	N/A	2	N/A	3	poor bond, brittle when dry
O' Glue (Clear Liquid)	1	N/A	2	N/A	2	only slightest bonding.
Green Glue (clear liquid)	0	N/A	2	N/A	2	poor bonding
Duro Black Plastic Rubber	10	N/A	1	N/A	1	no bonding at all
Brown Paper Package Tape	3	N/A	1	10	1	doesn't work when dry, good bond wet, curls when wet
Ambroid	8	N/A	1	N/A	1	no bond
Hot Stuff	9	N/A	1	N/A	1	no bond

which is just above half way on the scale of temperatures. The cards were placed on top of a telephone book because the paper tends to hold the heat in one location well, rather than conduct it away.

The results showed that the glues either would stick under heat or wouldn't. Many glues wrinkled the cards as they dried, but they tended to go flat again when they were ironed.

Other tests were conducted similarly to see if the heat would make the glue stick to another card without glue on it. None of the glues did this well except a spray contact adhesive that was designed to do this anyway. Contact adhesives were eliminated as prospects because they stuck as well when they were cold as when they were hot. Contact adhesives have some real advantages over runny liquid glues for rolling tubes, but tended to grab too well when a bond was not wanted between two surfaces.

Surprisingly Elmers or Tube O'Tacky (both white glues) were better at sealing together under heat than titebond. None of the glues tested seemed to grip quite as well under heat sealing as they did when applied wet. Tube O'Tacky gripped the best under heat this way because by nature it had to be applied more thickly than Elmers. It also left a lumpy surface on the outside of the card which could be undesirable in a rocket body tube. A forced ranking of the glues tested showed Elmers tube the most preferable glue to use making body tubes the heat sealing way.

TUBE TESTS

The next challenge was to select materials to use to make body tubes out of that could be compared to commercial body tubes. The Estes BT20 was selected as the tube to compare homemade tubes to because of its overwhelming acceptance ass the industry standard. It is the tube that fits the standard sized engine and is the size that most modelers would want to make first. This brought up the problem of finding an appropriately sized mandrel to roll around. Fortunately it was discovered at about this stage of the project that 1/2" thin walled electrical conduit pipe, available at all hardware and home improvement centers, is exactly the same size in outside diameter (.707in.) as a BT20 is in inside diameter. This was a fortunate discovery because mandrels made up of engines and tape give off noxious odors from burned propellant when heated and the tape gets hot and the glue lets go.

With a mandrel and glue system papers were what needed to be decided on. Since competitive tubes must be light weight some materials were chosen for this potential. These included 20 pound computer paper and construction paper. Traditional tube rolling materials like 110 pound card stock and 90 pound were included for their strength. Double strength grocery sack craft paper was selected because it is almost impossible to wet roll tubes with this stuff (it disintegrates when wet) and Estes tubes are made from craft paper. Finally spiral wound tubes were made using 1 1/2" wide adding machine tape with opposing spirals for strength. The Estes BT20 has parallel spirals.

A wet rolled and a heat rolled tube of construction paper were each made to test for differences between them. A long grain cardstock tube (paper fibers lay parallel to length) was made to compare to a short grain (paper fibers lay perpendicular to length) cardstock tube.

Parallel wound tubes were made in this manner. A lengthwise line was drawn in pencil to separate the glued side from the non-glued side. Elmers glue (diluted 50% with water for easier application) was applied to the right hand 2 5/8" of a standard 5" x 11" paper stock blank. On the back of the paper glue was applied to the side that did not have blue on the front of the paper. In this way as the paper was rolled around the mandrel it would match up with glue on the incoming sides. A 2 3/8" non-glue zone was on each side of a prepared stock blank. The stock blank was rolled around the mandrel with the nonglued side next to the mandrel. Some prior bonding and curling of the paper edges helped it tuck under the roller tightly. A little extra rolling after the paper was completely wrapped around helped tighten down the paper around the mandrel. When the paper was where it was wanted a hot (cotton setting again) household iron was applied to the top of the tube as it was rolled across a hard flat surface.

The middle was sealed together first, then gradually the iron was moved out toward each end while slowly rolling the mandrel in the direction of the paper wrapping. A crackling sound from the paper as it rolled indicated an incomplete bond and the tube was continually rolled until the crackling stopped. The tube was

removed from the roller after it cooled down for a few minutes and was labeled in pencil. The 3 layer tube was done in the same manner except it was done on a 7" wide blank with a 2 3/8" non-glue zone.

Spiral wound tubes were made out of 1 1/2" adding machine tape. 20" lengths of this tape were coated on one side with 50% diluted Elmers white glue and allowed to dry. On the 3 layer spiral tube the middle layer of paper was coated on both sides. The strips were spirally wound around the mandrel with sides just touching but not overlapping and with the ends taped to the mandrel. Each succeeding layer changed the direction of the spiral. The glue side was out on the bottom layer and in on the top layer when all layers were properly aligned and taped down the iron was applied with a back and forth rolling motion until the crackling stopped along the entire length of the mandrel except on the ends which were masking taped in place. The heat makes masking tape gooey. The ends were untaped so the tube could slide freely off of the mandrel. Each tube was then trimmed to an 11" length.

All tubes were measured for weight before and after gluing if possible. This was done on a pharmaceutical torsion balance accurate to .01 g.

BREAK (CANTILEVER) TEST

Two tests were devised to test the tubes for strength. The cantilever (or break) test involves holding one tube end firm while applying weight to the other end. A piece of 1/2" thin walled electrical conduit had tape wrapped around it 1" from one end. This pipe was attached to a sawhorse so it was parallel to the ground with the taped end protruding over the end of the sawhorse. The tube being tested would be slid onto this pipe for 1" until it hit the tape. An apparatus was attached to the other end of the tube in question. It consisted of a 1" piece of Estes engine casing with a screw glued in its center which was plugged into the open end of the tube. A plastic bucket with a wire handle was hung over the protruding screw. Pennies averaging 2.76 g. each were individually added to the bucket until the tube failed structurally. The bucket and plug weighed 28.84 g. collectively. This weight was added to the penny totals to get the weight to break totals. There was usually a resounding crash as the tube snapped and the bucket hit the floor. The pennies were counted and then the process was repeated for each tube.

SQUASH TEST

The squash test involves adding weight to a bucket suspended entirely on top of a 2" length of body tube laying on its side. The tube is place on top of a sawhorse. A board is placed on top of the tube. Wires connect the board to a bucket underneath the sawhorse. Pennies are added to the bucket until the normally 3/4" diameter tube is squashed to 1/4" height. Blocks on top of the sawhorse indicate when the board has reached this position. The board and bucket apparatus weighed 108.59 g. which was added to the weight of the pennies. Squashing is a gradual process and took a surprising amount of weight.

DATA

The data collected and results obtained are listed in detail in the Glue Comparison Chart and Body Tube Comparison Chart. In brief both Titebond and Elmers glues display the heat sealing properties. White glues all seem to display this property better than yellow aliphatic glues.

OBSERVATIONS AND CONCLUSIONS

Body tubes proved relatively simple to make using this method. There is no wet glue to contend with when rolling the tube and the paper can be aligned precisely before it is permanently glued down. A number of materials thought previously to be impossible to make tube out of have proven to make good tubes this way.

When some tubes made this way in a BT20 size were tested against Estes BT20 tubes the heat sealed tubes did surprisingly well. All tubes except the very lightest spiral wound tube did better than the BT 20 in the cantilever or break test. A column called strength per weight in the Tube Comparison Chart compares net weight of the tube to net weight required to break the tube. The BT20 did the worst of all in this respect. This points out a glaring weakness in the BT20 construction. Both spiral layers run in the same direction around the

tube and each layer of tube material is not touching itself in the next spiral, but may be as much as 1/32" apart. In practical experience BT20's always seem to buckle along their seam lines when they break, which is exactly what they did here. There must be other economic or production parameters that encourage Estes Industries to continue to produce the BT20 in this compromised configuration.

The 3 layer parallel wound tube of computer paper weighed exactly the same as a comparable BT20 but withstood almost twice as much weight. This statistic alone goes a lone way toward establishing heat sealed tubes as viable alternative to commercial tubes.

The squash test proved rather inconclusive. The lightest tubes squashed easiest, the heaviest tubes could not be squashed even with over 5 pounds of weight pressing on them. The BT 20 was very strong in this respect. Going from a 2 layer to a 3 layer format made a much more than proportional gain the squash resistance.

Surprisingly the 110 pound cardstock didn't do as well as the 90 pound cardstock in either test. One could have been mislabeled but their weights tend to support their listing. The only reasonable explanation seems to be that the fibers in one paper must be put together better than in the other paper.

The wet rolled tube did slightly better in both tests than the heat sealed tube. This is not unexpected. It was observed earlier that the heat sealing method doesn't seem to get quite as much stick out of the glue as the wet rolled method. Since only two tubes were tested this can't be interpreted as conclusive evidence but it indicates an area where further investigation is needed.

Certain materials seem to be inherently stronger; both computer paper tubes did much better than both construction paper tubes despite their lower weight.

FUTURE STUDIES

All of the tubes represented in the test have been flown successfully in model rocket applications without a single structural failure with the exception of one poorly planned super-roc. Even the lightest of these tubes has performed well. All of the materials previously believed to be too thin need to be re-examined for possible use in heat sealing applications.

Certain problems were encountered in this and subsequent tests (not reported on in this paper) with these tubes. In attempting to roll a spiral tube more than 3 feet long difficulty was experienced removing it from the mandrel. It was discovered that the mandrel had wide spots and narrow spots of a few thousandths of an inch. Studies investigating the conformity of the tube to the mandrel versus thickness of the paper could help eliminate this potential problem. The tubes made from thicker stock didn't seem to conform to the mandrel as tubes rolled from thinner stock in this study.

It was observed that the Tube O'Tacky glue being thicker tended to seal better than Elmers glue. It seemed possible that the 50% thinned Elmers glue used in this study may have been too thin for optimum bonding. The thinner glue would spread farther causing it to have less material available for polymerization. Certain papers may absorb more glue in to the fibers making less available to work on the surface. Certain papers may initially resist bonding to thin glue causing it to partially bead up in some spots yielding a poor bond. Studies on what is optimum for spreadability opposed to bondability need to be conducted.

FINAL CONCLUSION

The tests conducted here, though limited, definitely point to a whole new method for making body tubes. The techniques are simple, and inexpensive and all the materials needed are readily available at almost any store. The tubes produced can be lighter and stronger than those commercially available today.

Editor's Note: It appears that there should be a number of uses for this technique, both for competition, and for the modeler who wants to save a bit of body tubes. Congratulations to Randy for his excellent project.

World Champion FAI Streamer Duration Design

flown by Jordan Pavlov of Bulgaria at 1985 WSMC

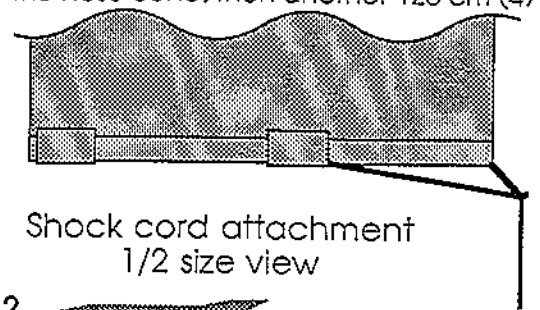
Presented here are the full size plans for the gold medal winning model in streamer duration. Jordan Pavlov of Bulgaria successfully defended his world championship in 1983 by beating Juri Taborski of Czechoslovakia in a flyoffs by a mere 7 seconds. Matt traded an electronic stopwatch and a T-shirt to get 2 of Pavlov's three competition models. Anyone out there want to buy some land in Florida?

The bird's descent mass is 11.5 grams, of which the streamer mass makes up 4.5 grams. The mass of the model with a burned out casing is 7 grams. The 10 mm micro A motor casing is too tight in model to risk removing to determine the mass of the model without engine.

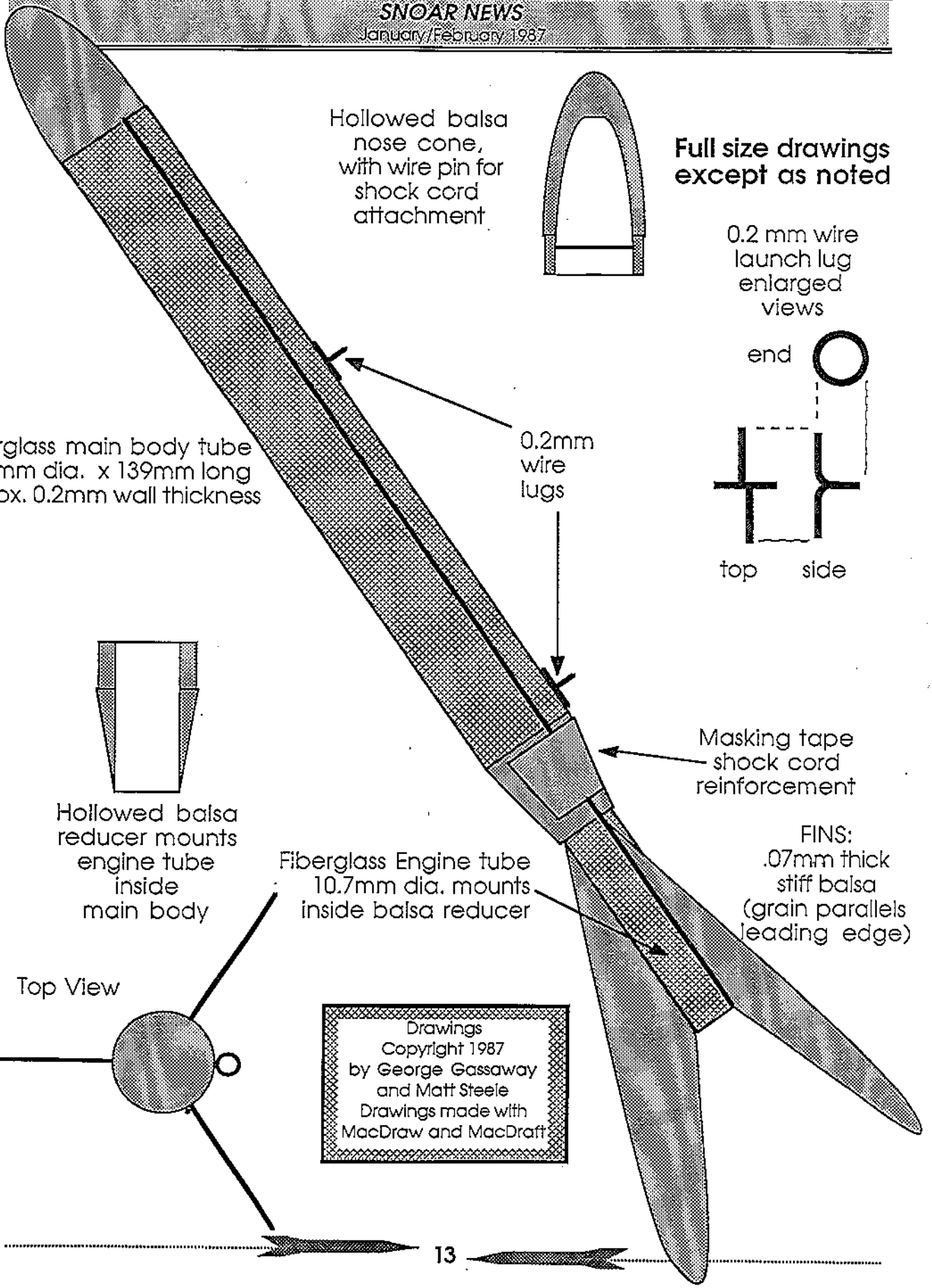
The model is unpainted. The exposed balsa surfaces are smooth, apparently having a few coats of clear dope for finishing. The glue used to attach the fins is not obvious, but does not seem to add much weight. The tubes are very thin fiberglass. In fact, the streamer must play a part as a structural element during boost, as the tube seems flimsy until the streamer is inserted. Note that lugs, rather than a tower, is used for launch.

The streamer size is 140 cm (55") long by 10.8 cm (4.25") cm wide, for roughly a 13:1 length to width ratio. Its thickness is roughly .02 mm (about 3/4 mil) of what seems to be thicker mylar than most U.S. streamer duration fliers have been able to find. The streamer is accordian folded for its entire length, with folds approximately 12.7mm wide (1/2") near the shock cord end growing to 19mm (3/4") at the top end of the streamer (this allows the most efficient packing of the streamer in the model, but may also play a part in performance).

The shock cord is attached to the bottom end of the streamer with a very sticky type of masking tape which also produces a somewhat stiff "leading edge". The shock cord is tied in such a manner that part of it acts as a yoke to angle the leading edge, which apparently helps produce desireable whipping action (it may also cause the streamer to rotate). This resulting leading edge angle is not drawn as it should be in the whole model descent illustration at left, but the yoke is drawn properly in the illustration below. (Editor's note: There is some question as to the legality of this method. Certainly don't try this at NAR meets.) The shock cord consists of thick thread or thin cotton cord that is glued to the fin root with addtional reinforcement from a section of masking tape applied over the cord near the balsa rear adapter. This is located so that the model hangs horizontally. The shock cord runs 38 cm (15") from the masking tape to the nose cone, then another 120 cm (47") to the streamer.



Shock cord attachment
1/2 size view


Hollowed balsa nose cone, with wire pin for shock cord attachment
Full size drawings except as noted
0.2 mm wire launch lug enlarged views
end
top
side
Fiberglass main body tube 18.7mm dia. x 139mm long Approx. 0.2mm wall thickness
0.2mm wire lugs
Masking tape shock cord reinforcement
Hollowed balsa reducer mounts engine tube inside main body
Fiberglass Engine tube 10.7mm dia. mounts inside balsa reducer
FINS: .07mm thick stiff balsa (grain parallels leading edge)
Top View
Drawings Copyright 1987 by George Gassaway and Matt Steele Drawings made with MacDraw and MacDraft

Inspired by Robert Anderson!

You just KNEW we couldn't ignore the "Tormented range cat" Rocket Tip in the September issue of AMERICAN SPACEMODELING . . . . We're too depraved to let that slip by. So, we're sponsoring a contest to celebrate Robert's (and our) bad taste :

Amaze your modroc peers!
Win friends and influence people!
Show America how truly warped you are!
Enter SNOAR's new CONTEST:

. . . . 101 USES FOR A TORMENTED RANGE CAT!

Now it's up to you . . . . Tell us YOUR favorite use(s) for a tormented range cat. Mister Maddog is chief judge for this competition, so let's see some really sick and twisted suggestions!

So what's in it for you? We're glad you asked. . . . .

Grand Prize:

Win an all expense paid date with Mary Roberts.

No, wait, we've already done that one. How about your choice of a free North Coast Rocketry kit? Is that okay Matt? Not even one lousy kit?? Well, how about a free subscription to SNOAR NEWS? No? Note even a few issues? Okay, forget the small stuff. . . . we're going all out on this one: That's right! **Your idea, illustrated by Mr. Maddog himself, published in a future issue of SNOAR NEWS!!!**

Entries will be judged on originality and humor content. Send your suggestions by 3/1/87 to:

TORMENTED (Aaack!) RANGE CAT CONTEST
c/o Mr. Tony "Maddog" Williams
Route 1, Box 428A
Jasper, AL 35501

Sorry, actual tormented range cats will not be accepted!
Offer void where prohibited by good taste (obviously not Texas).

Rocketry Addiction: A High Tech Abuse

by Vince Huegele

"I was just a kid when I got started on rockets. It was innocent, simple, harmless at the time. I never thought it would lead to this."

These are the words of a rocket addict. He's not a monster or a freak, but a regular person who got too involved in model rocketry. A hobby that gives simple pleasure and intellectual diversion to many becomes a source of abuse to a few. This person took rocketry farther than it was ever intended to go. From this abuse came a dependency. Now he's got a problem.

"I don't want to spend all my time, my whole life with rockets. But I do. I love the roar of the engine; the smell of the exhaust. It's a high. A high I have to have."

He's hopelessly hooked. The path down the road to ruin is always the same story.

"I'll never forget my first launch. Astron Alpha with a 1/2A62 engine. Sweet little thing. Just a beautiful experience. But as soon as I got it back, I had to shoot it again. This time-what would an A engine do? Another model and B engines came quickly. And before I knew it, C65's were my mainstay. After awhile, it wasn't enough."

The addict never plans to get in very deep. But the lure of bigger kicks, higher highs, and faster rushes soon takes over and he has to shoot more.

"The move to D engines was scary but it was worth it, I thought. This was good stuff and I knew it. Sure beat those little T size jobs. I was doing those for breakfast, man. Then I'd go out that afternoon and cluster a few D's."

'Cluster' is user talk for lighting several engines at once. He was no longer an occasional flyer like most rocketeers who fly socially.

Yeah, I was up to several packs a day. Seemed like nothing. I could handle it. My life was under control. Then one day, this guy introduced me to composites."

Composite motors are restricted to professional use for industrial strength applications. With the right connections, they can fall into the hands of amateurs. And the people who use them are never the same.

"They told me it was the ultimate high and man it was. Nothing like it in the world. It was clean, quick, good and just out of sight. But it was expensive. I had to have those F and G motors, not too often I thought, but I had to have them. So I began to deal."

To support his own habit, he was now compelled to entice others into his desire. By selling, he could keep a steady supply of whatever he wanted flowing through his hands.

"Finally, I had everything. All the time. Everything was rockets and rockets was everything. I had the highest powered stuff there was; H,J,K,L and other letters of the alphabet. I thought I had it all, but actually, it had me. It didn't hit me til I OD'd."

The details of an overdose are not pretty. Sometimes it's clustering an obscene number of H engines. Sometimes it's confusing models with military ordinance. Sometimes it's accumulating more kits than ever possible to build. Regardless of the trigger, the person's life comes crashing down. They call it 'pranging'.

"I never knew I had it so bad. It didn't seem bad. It was so--educational. That's what they said. But there was a lot they didn't say. I had to find out the hard way. I want other people to be warned, be careful. You play with fire, you get burned."

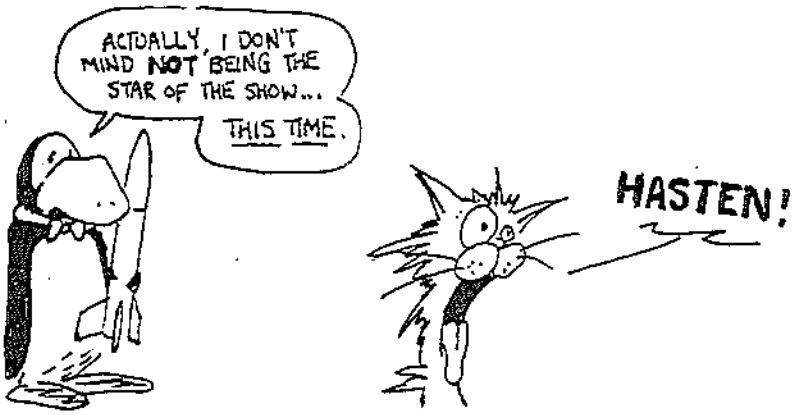
Fortunately, this addict is responding well to treatment and is finding a place in society. There are others out there, lost and hurting who don't know where to turn. Still others aren't even aware of the trouble they're in. The following warning signs indicate a person may be a rocket addict:

Does he give a countdown before simple acts like flushing the toilet?
Does he declare, "we have ignition," when starting the car?
Does he throw away paper towels just to get the tube?
Does he insist his rockets "aren't models but <u>real</u> rockets'?
Does he have a room that looks like an armory for a third world nation?
Do his clothes smell like sulfur?

If you know anyone with these symptoms, they need help. Call the nearest crisis help line and turn the guy in. While you're at it, report for a checkup yourself. Besides being addictive, rocketry is highly contagious and many an unsuspecting soul has been caught up in another's wake. Our friend knows all too well.

"Tell them to go easy. You can do rockets in moderation and its alright. Moderation, yeah, that's the ticket. Or just say no."

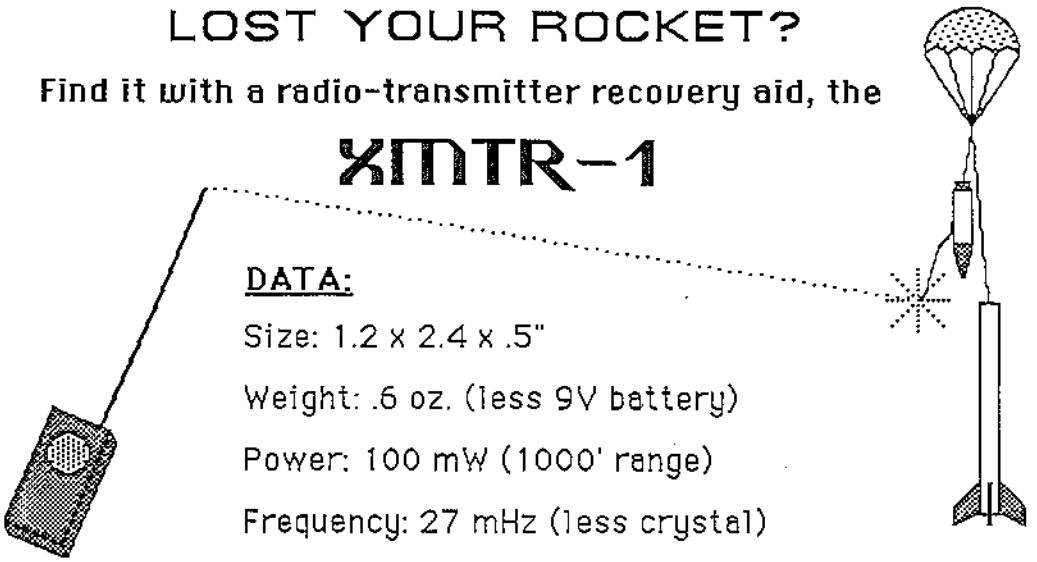
OPUS SAYS:



LOST YOUR ROCKET?

Find it with a radio-transmitter recovery aid, the

XMTR-1



DATA:

Size: 1.2 x 2.4 x .5"

Weight: .6 oz. (less 9V battery)

Power: 100 mW (1000' range)

Frequency: 27 mHz (less crystal)

- Pulsed-tone signal can be received by walkie-talkie
- Assembled and tested
- $25 each, or two for $40

Order from: TRANSOLVE, 1197 Genesee, Mayfield His, Ohio, 44124

From Your Sometimes Sober Editors *(continued from page 3)*

John Worth and countless others, all contributed greatly to the expansion of the hobby. We at SNOAR NEWS salute all those who have helped achieve these changes.

Certainly it does not end here. As you read this article, the NAR Board of Trustees is getting ready to review the Barrowman Commission's "Report on High Power Rocketry". The Commission's report is the result of the high power community (including the LDRS Consumer Committee of Chris Johnson, Bob Geier, Bob Ferrante, Jim Dunlap and Chuck Mund) requesting the NAR to examine extending services to rocketeers who wish to fly H or bigger motors. It is likely there will emerge additional good news for modelers from the meeting, although there are many complex political and legal issues at hand.

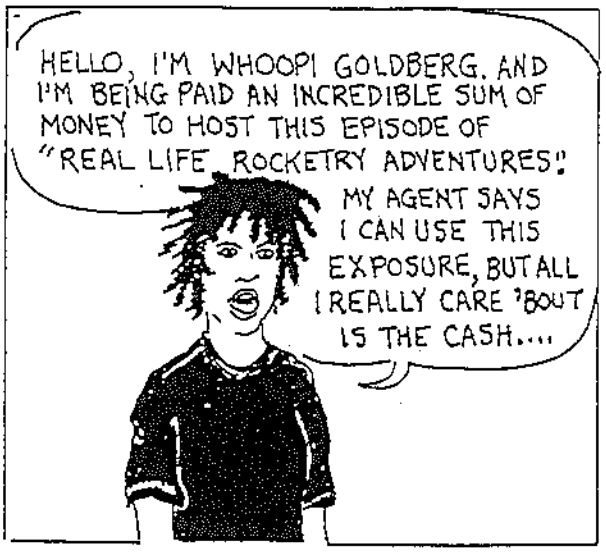
The net result of all this? We have finally seen the day when the bureaucracy has stepped aside and allowed us to have more freedom and less regulation. It is a significant victory, indeed.

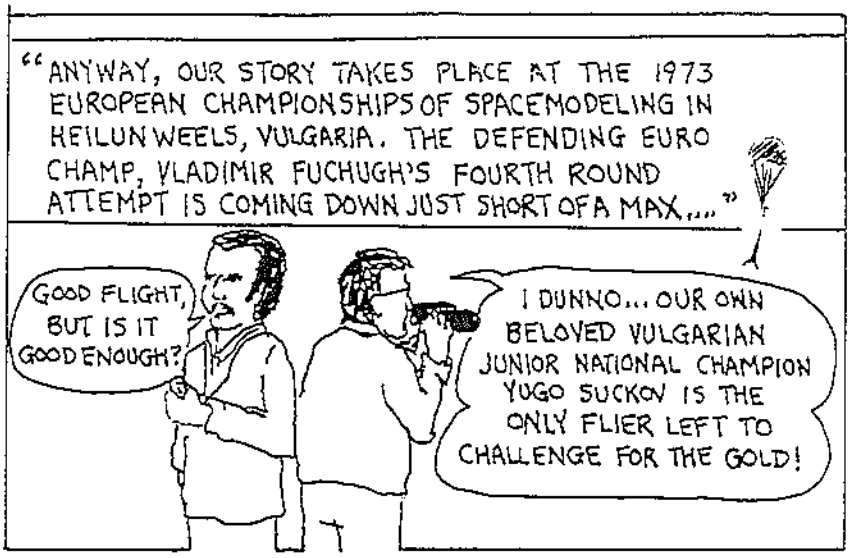
Matt & Mac

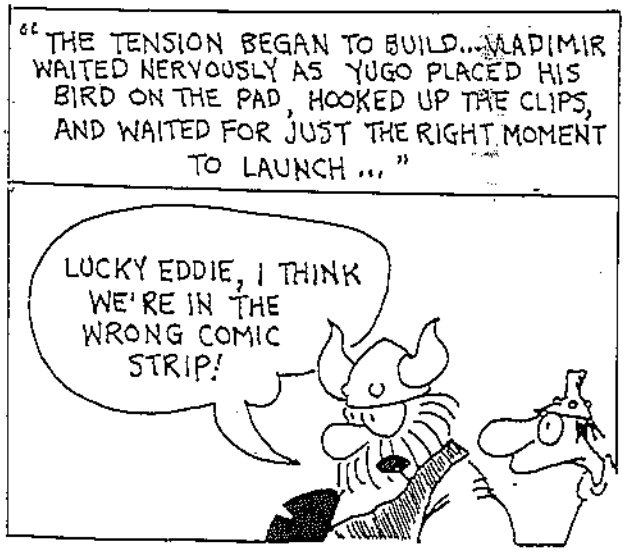
SNOAR'S REAL LIFE ROCKETRY ADVENTURES

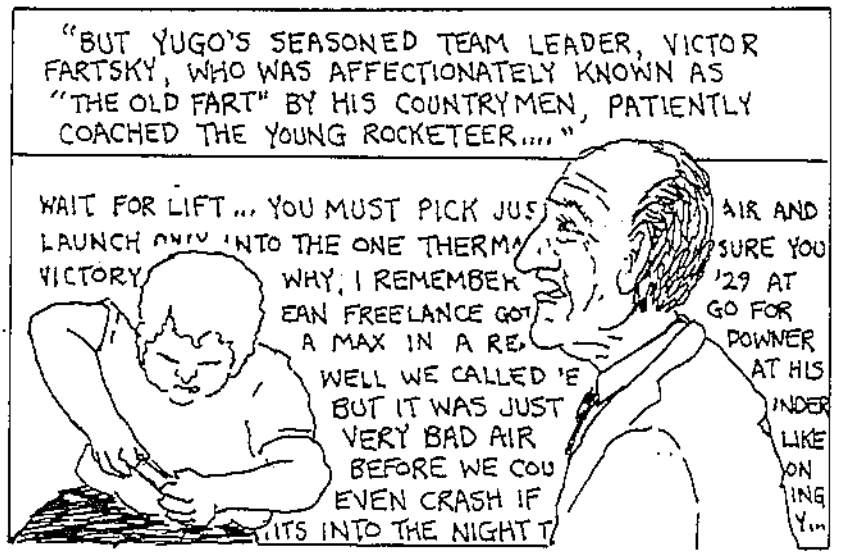
WITH SPECIAL GUEST HOSTESS WHOOPI GOLDBERG

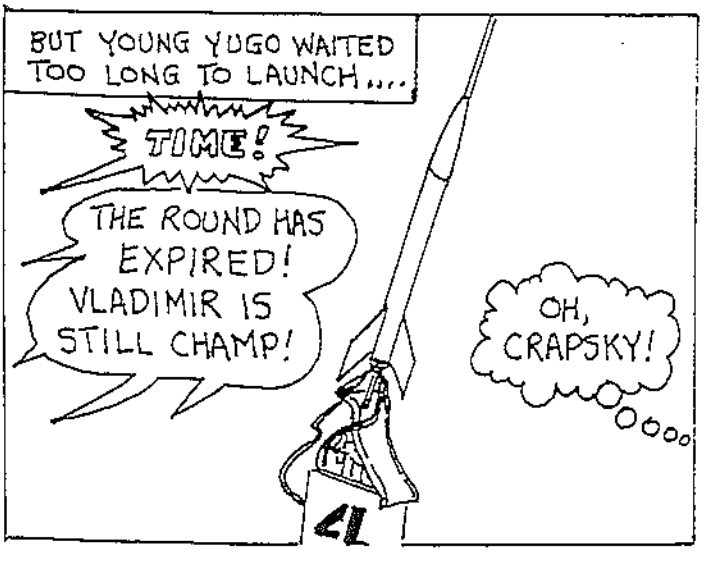
by Mr. Maddog ™

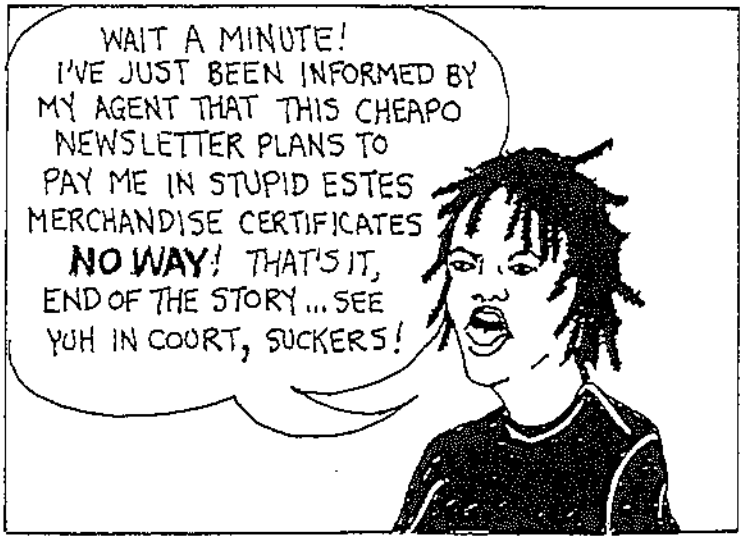


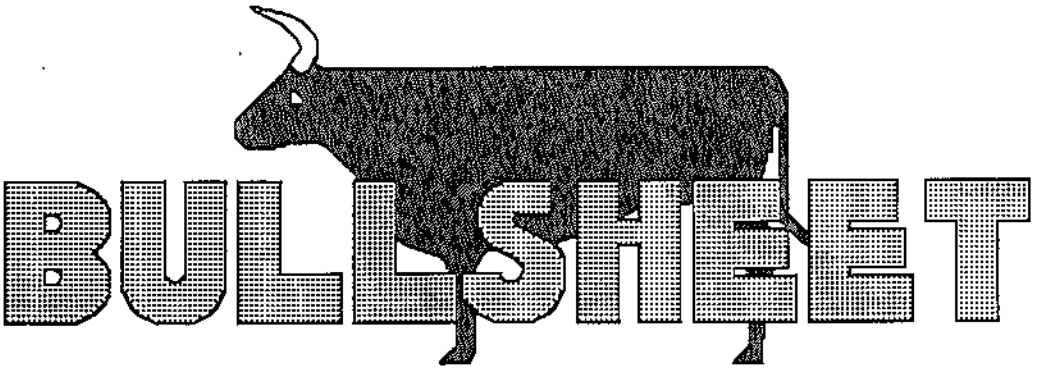












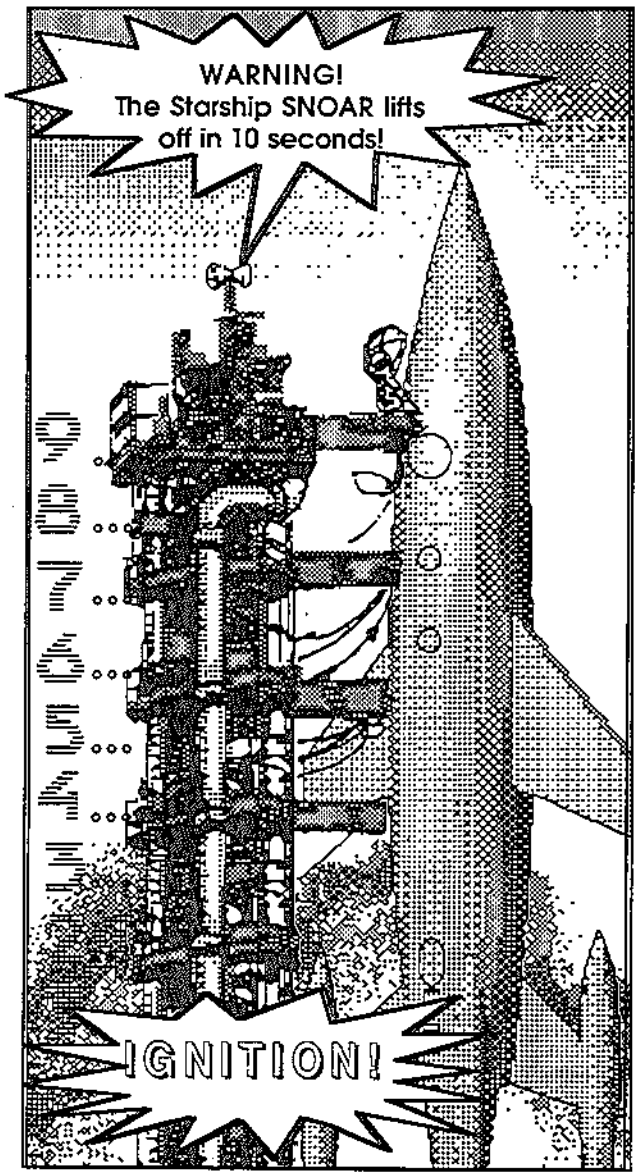
Model Rectifier Corp. (MRC) has indeed released model rockets! As was previously reported by SNOAR NEWS, MRC was at the Pasadena HIAA Hobby/Craft Show with a large display featuring model rockets. They released a line of black powder A, B and C motors which feature epoxy nozzles. They are currently safety certified by the NAR (seems MRC submitted the motors a few months ago), and actually might be priced slightly less than Estes's motors. MRC also displayed their Super Ignitors, which are flashbulb type igniters, priced 6 for $2 or so. The rocket kits were of the Almost Ready to Fly type, with two basic plastic nose cones and fin units to work with. The launcher is called the Lunar Launcher (a Porta Pad clone) with an Electro Launch (yep, that's what they called it) launch controller. It looks as though MRC will compete for Estes's share of the market the way MPC did years ago. Makes you wonder who did their market research, though, doesn't it?

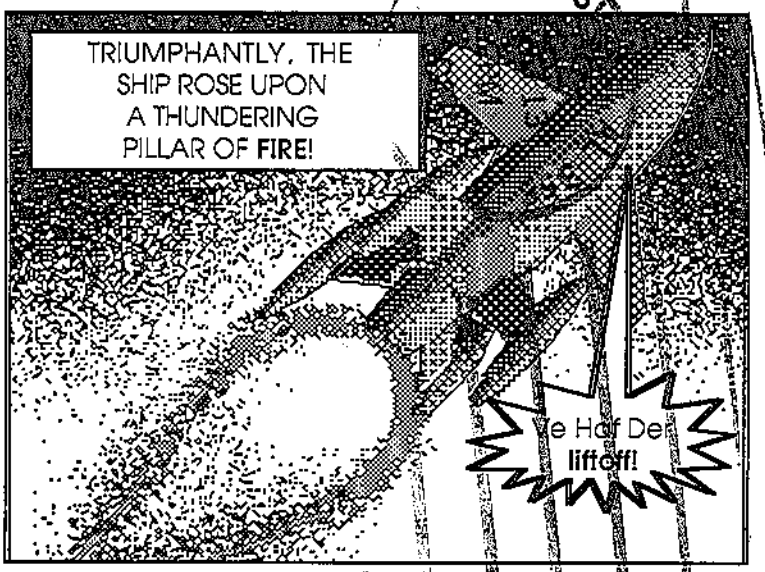
Estes brought out it's new kits and catalog at the Trade Show, too. Tops in terms of interest would have to be a tie between the Geo Sat LV ($13.49) and the Jupiter C ($12.49). The Geo Sat LV is a refreshing kit from Estes, using shuttle strapons and a clear payload section with a detailed satellite inside. The Jupiter C is a logical extension of the Estes (formerly Centuri) Mercury Redstone, using the same 2" diameter tube and fin planform. Clearly, a nice model to own, whether one is a scale freak on not. Neatest little model is the Mini Mars Lander (think some one at Estes Marketing is reading AmSpam?). It's for mini motors with streamer recovery, and only $3.95! Of moderate interest is a Gemini Titan kit ($8.95), the futuristic Interceptor II ($7.95) and the scale Bullpup 12D ($5.95). The Skyhook has been re-introduced with new decals ($5.29). Also, Estes has a neat little launcher called the Lunar Launch Pad, but you can only get it with a starter set. It's not for anything bigger than a BT-50 model, though. The worst example of merchandising is the Ninja (yep, that's what they called it) kit and starter set (BARF!). Makes you wonder who did their market research, though, doesn't it? Prices did not significantly increase, thank goodness.

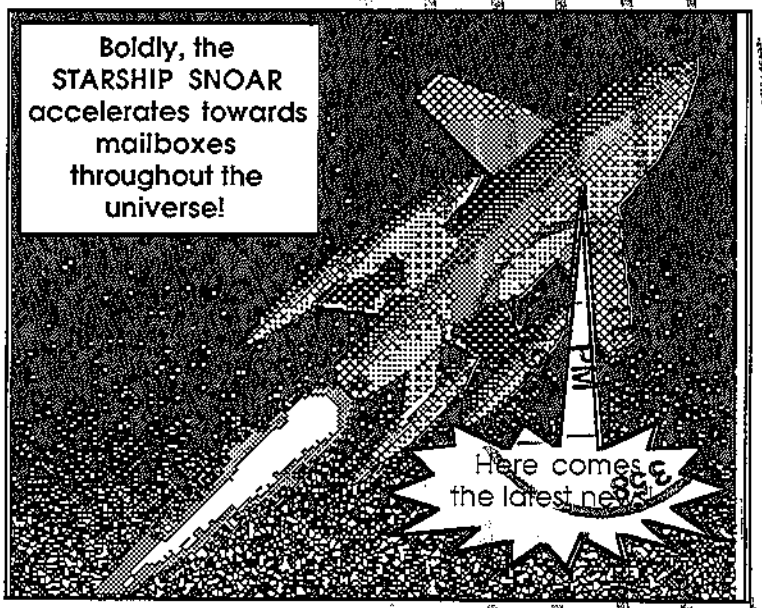
Aerotech customers take note: If you got a Tripoli postcard in the mail saying to return your Aerotech motors because they were defective, ignore it, and send your postcard to Tripoli or Aerotech. It seems as though someone with malicious intent mailed out these hoax postcards after the first of the year. Legal actions against the persons involved is being considered.

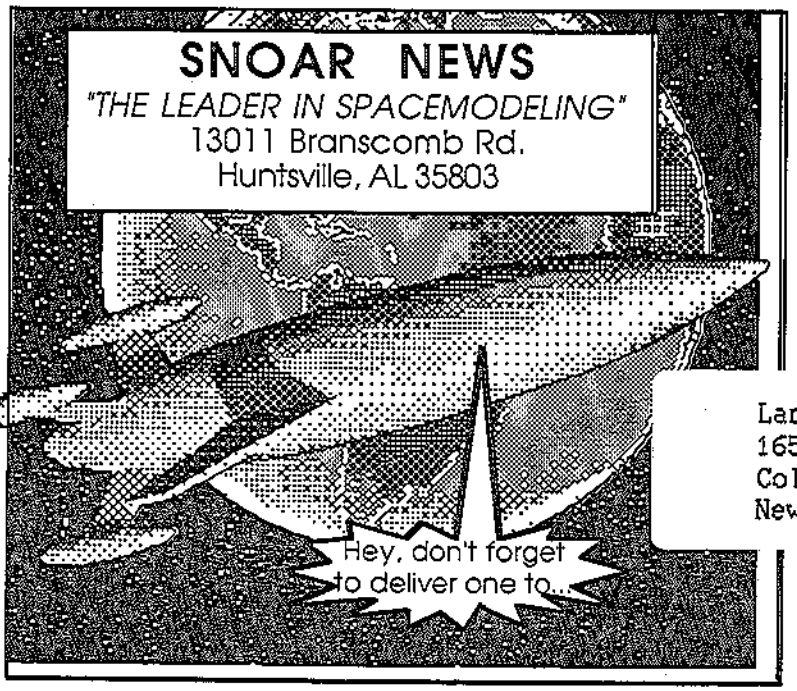
Chas Russell has taken over the Contest Board for an overworked Terry Lee, but it will only be for eight months or so. It seems Chas is headed for Belgium in his next assignment.

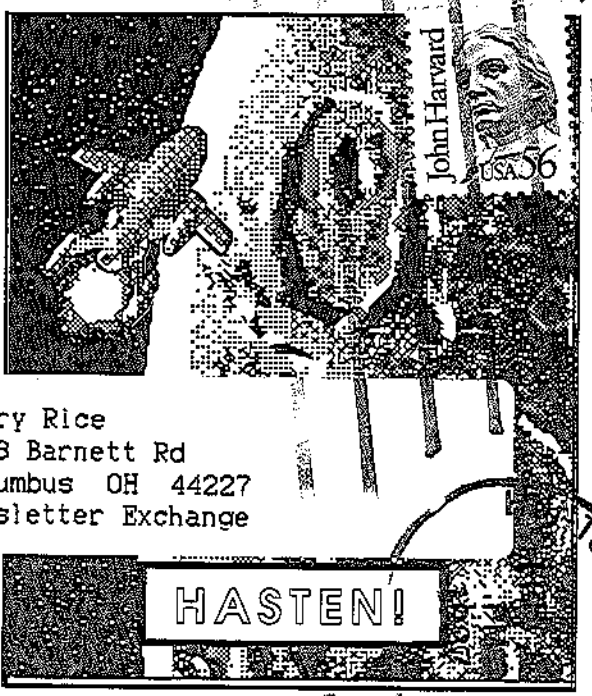
North Coast is busy preparing its new kits. Look for a new catalog near the first of May, with at least 10 new kits, including a monster BT-39 ASP that stands over seven feet tall.











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