



March 17, 18, 19th, 2000

The Reaction Research Society Motor Making class.

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If you have ever wondered or thought about trying to make your own AP motor, you should try and attend one of the RRS motor making classes. They offer a three-day class, which covers the basics and safety measures when dealing with AP motors. I myself, bought one of those Fire Fox AP starter kits, and after reading the instructions, I thought I should wait and maybe get some experienced individuals to guide me first, before I mess with the stuff.

The following is a pictorial tour, or guide if you might say, of the three-day course.

Day One March 17, 2000 Friday.

The first day of the motor making class was academic. The whole day was spent in the conference room at the Stratford Inn Hotel in Lancaster California. My good rocket buddy Neil Saunders attended the class as well. Day one was very thorough and very informative. The members of the RRS introduced themselves, and then we got down to business.

The first day covered the following:

- Safety
- Rocket Design Considerations
- Engine Hardware Design
- BATES Grain Configuration
- Static Testing/Instrumentation
- Propellant mixing, Casting, and curing
- Igniter design
- HTPB Propellant Formulation Considerations



Myself, being attentive.



My buddy Neil Saunders ready to get
Down to making some motors.



<- Neil showing off the nozzle from the RRS
rocket that achieved 50 miles in altitude in
1997.



Day two. Saturday March 19, 2000

The day the mixing begins. By 0800 hrs
in the morning, all 21 students arrived at The RRS Mojave Test Area.

The MTA is about 21 miles outside of the town of Mojave, just behind Kohen Dry Lake
bed.



The identifying Building at the MTA site

<http://www.rrs.org/>



The luxuries of Home.



Mr Neils Anderson has a roll call on Saturday Morning, and starts covering the procedures for mixing ingredients for the AP motor.



The Sono-tube in the picture would be great for a rocket wouldn't it?

The days activity for Saturday March 18th, 2000 are the following:

- Mixing
- Casting
- Curing
- Coring

- Chamfering
- Assembly of rocket engine

MTA Arrival

8:00 a.m. Cannon Salute

MTA Compound Tour

8:10 a.m.

8:45 – 11:45 a.m. Formulating discussion and weighing out of composite materials.
Two separate propellant mixes are going to be done.

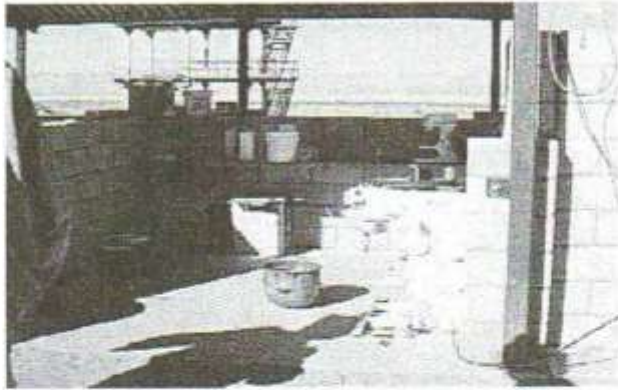
- Begin mixing procedures and turn on curing ovens for preheat
- Packing fuel capsules and place in incubator

Lunch when convenient. **Be sure to wash hands before eating any food.**

- Group Picture and Book Signing.
- Coring, Sanding, Chamfering, and Prepping of individual Bates grains.
- Assembly of rocket motors
- Instrumentation and load cell calibration
- Class Test Motor Static Testing



- Beginning of mixing procedures



site of the mixing in of the AP after the inert mix is prepped



□ Packing fuel capsules area



☐ Packed fuel capsules



☐ Placing fuel capsules incubator



☐ Cleaning off the excess on the outside of the capsules



☐ Sanding the edges of the capsules for accuracy



□ **Coring the fuel grain.** The core for the motors was the basic BATES grain. It was found that coring the AP after it had been packed and cured reduced the amount of possible pockets that are sometimes found if a core is inserted before packing the casings with the propellant.



□ Chamfering the core after being drilled out



□ Sanding the edges to expose the AP grain



* The grains are prepped and ready for final motor assembly



□ Guided discussion on how to load the motor for testing



Partner in Crime, Neil Saunders loading the motor casing



The Motor holding bin prior to static firing



Showing off the finished product



Burning off the excess propellant



Burning off the cored out excess



No Body around but us Rocket Enthusiasts

Sunday March 19, 2000

Days activities

- Final Assembly of rocket motor
- Group Picture
- Static Firing

7:00 a.m. – Cannon Salute

7:10 a.m. – Propellant Burn – off

7:15 a.m. - Igniter assembly

8:15 a.m. – 10:00 a.m. – Start Student Static Testing

Individuals who have airline reservations for Sunday will get first priority in firing.

Lunch, when convenient. **Be sure and wash hands before eating any food.**

Clean up motor tube after static testing. Turn in all expended igniters.



Setting up the test stand for the motors



Mounting on the first motor



The spectator area prior to the first firing



Students in the proper area prior to test firings



First static firing



Another static firing



Group Class Picture

If you ever get a chance, and have ever thought about making your own AP motors, you should attend a class like the one offered here at the RRS. Of course you cannot learn everything about solids in just three days, but this is a good course to take, and a good place to start.

On top of this class, you also become an honorary member of the RRS for one year with the option to become an actual member if you would like, and within this first year, you can use their facility with proper coordination with either the president of the RRS or Neils Anderson if you would like to test your project if you would like.

On top of that, you also get a Beginning Solid Propellant Rocket Propulsion Course Book, software with your motor data, the motor hardware, and a wealth of knowledge not just from the RRS members, but from the people who have attended the class with you as well.