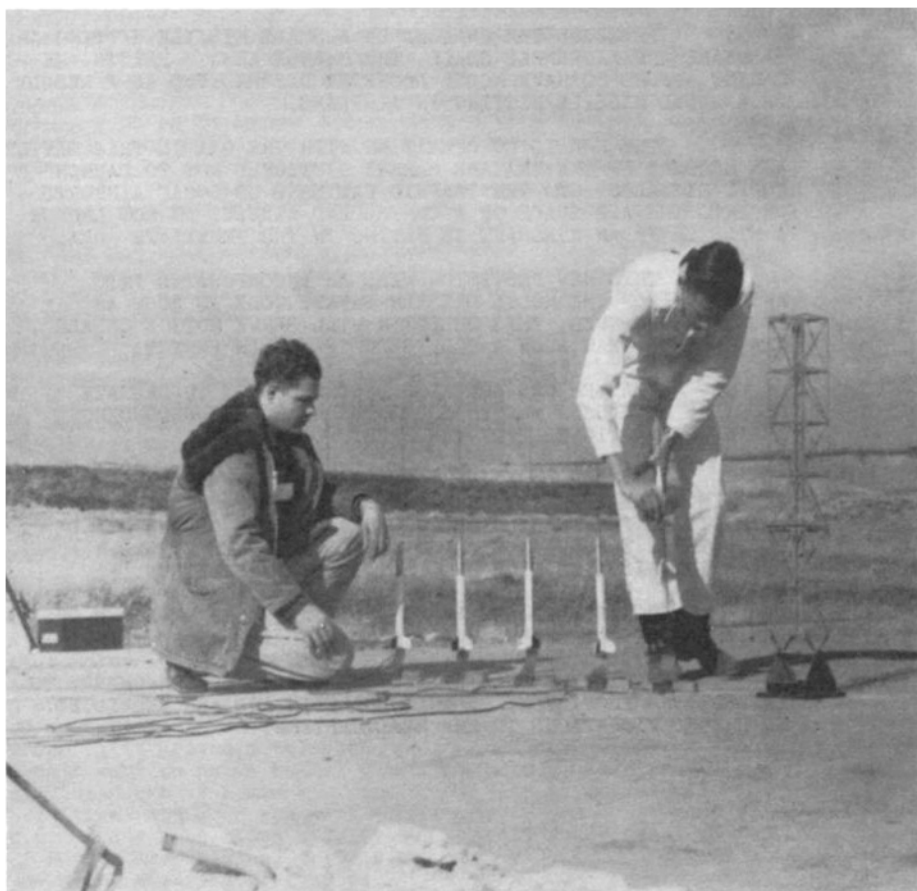


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THE DO'S AND DON'T'S OF MODEL ROCKETRY

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MMA #1

Some of you have been tempted to make your own rocket propellants and rocket airframes. Those of you who have done so and who are still with us and who still have all your fingers, eyes, hair, and head are luckier than you are scientific. Just because you have played around with a chemistry set you got for Christmas, don't think that you are familiar with the chemicals needed in rocket propellants!

None of us like to read a list of DON'T's. But the simple fact remains that our lives and our society are governed by rules and regulations. If we fail to obey them, we get into trouble. If the rocket builder does not follow the rules, he won't be around long enough to break them again. When he has an accident, the whole field of model rocketry becomes discredited.

Before you consider mixing your own rocket propellants and making your own rocket airframes, let me point out some of the grave errors that are being made every day by would-be rocketeers. Not only will I tell you DON'T do such-and-such, but I'll tell you WHY YOU SHOULD NOT DO IT.

DON'T make your rocket airframes or motors from any kind of metal. If your rocket should explode, the metal pieces will fly like shrapnel, and some one is sure to be injured. Metal rockets are too heavy. Because they are heavy, they must be made very large. You should never make a model that weighs more than 4 ounces, including propellant.

DON'T use empty carbon dioxide (CO₂) capsules as cases to contain your propellant. They make regular hand grenades when they explode.

DON'T try to launch your model off its fins. Be sure to build a launching ramp or tower that fits your model. Provide the model with guide lugs so that the initial movement of the model is constrained to the vertical. Never launch at an angle lower than 60-degrees. Be sure that your tower or ramp is tall enough. Many models take several feet of movement before they have built up enough speed to maintain stability.

DON'T forget that wind will affect the flight path of your model, both up and down. Always launch your model with the wind. Be sure the area directly underneath the launching tower is free of dry grass or other combustibles. If you want to be sure of getting your model back, be certain that there are no trees, buildings or wires in the area for your model to land in.

DON'T use matches or home-made fuses to fire your models. Use a tested electrical system. Be sure your electrical system is unhooked at the power source or is shorted out before hooking the lead wires to the rocket motor igniter. It is best to have a positive spring-loaded switch that returns to the "off" position when you release it. Be at least 25 feet away from the rocket when it is launched, and insist that all spectators be in back of you and out of the area where the rocket will land.

DON'T EVER EVEN CONSIDER USING LIQUID PROPELLANTS IN YOUR MODEL. You don't have the brains, equipment, location, or experience for this phase of rocketry. So forget it, and live longer.

A great deal of publicity has been given to the use of a propellant made of zinc dust and sulfur. This mixture has been used by amateurs because the two materials were easy to obtain. But this mixture has been one of the big causes of accidents. It has given some spectacular results -- and the most spectacular thing about it is the terrific cloud of smoke that it makes. Its action in a rocket is unpredictable. Rockets using this propellant must be made big and heavy. This propellant is of no value in powering scale models.

DON'T use zinc dust, aluminum dust, or magnesium dust in any rocket fuel mixture. The dusts of these metals unite with oxygen readily. When mixed with chemicals rich in oxygen (chemicals that will yield oxygen readily), very unstable mixtures are the result. In addition to being unstable and unpredictable, dusts of metals are injurious to the lungs.

DON'T use potassium chlorate, sodium chlorate, barium chlorate, or ammonium nitrate in any propellant mixture. These chemicals, when mixed with sulfur, organic materials, or certain hydrocarbons, form very sensitive mixtures which can explode under slight friction, shock, or slight rise in temperature. Many home-mixed propellants are apt to take fire spontaneously. This is especially true of any chlorate and sulfur mixture, due to minute amounts of free sulfuric acid present in the sulfur. Perchlorates are more stable, but use should be attempted only by experts. You aren't one yet.

DON'T FORGET that static electricity is capable of firing rocket propellant mixtures. This has been the cause of many pre-mature explosions of rocket propellants.

If you must try to make your own propellants, get the help of your chemistry teacher or some other qualified person. This is not a fool-proof idea, either. You may recall the death of a chemistry teacher and the injury of 13 students in Texas last December when their test rocket exploded. Make all test mixtures in very small amounts, not over 1/2 ounce at a time. Make or have tests made to determine the flash point and how safe it is from friction, shock, and spontaneous combustion. Have tests conducted to see what its action is when ignited in the confines of a rocket motor. Some propellant mixtures burn slowly and evenly when ignited in the open air, yet detonate violently and with disastrous results when fired in a closed tube.

Most of the chemicals used in many rocket propellants are poisonous.

My best advice is: **DON'T TRY TO MIX YOUR OWN PROPELLANT!** **DON'T** subject any rocket propellant to any friction, grinding, or rough handling.

DON'T attempt to ram or pound a rocket propellant mixture into a motor case unless you are positive of its safety when handled in that manner. Use Wood or non-sparking tools when handling rocket propellant mixtures.

DON'T use anything but balsa wood for fins, light wood for nose cones, and paper for rocket bodies. The case containing the propellant should never be made of anything but a stout paper tube.

DON'T launch a model that is not equipped with a positive parachute recovery system. Even a 3- or 4-ounce model whistling down from 1000 feet altitude can be a dangerous object.

DON'T approach or examine a mis-fire for at least 15 minutes. Then be sure all power is off. Approach it with caution. In most cases, it is best to soak the mis-fired motor in water. Wash the soaked propellant down the drain or bury it.

DON'T heat up any propellant mixture for any reason! Don't let your rocket stand in the hot sun for long lengths of time.

DON'T attempt to use any high explosives or blasting caps in any model or for any reason. It takes trained experts to handle these things, and you don't have that training yet.

DON'T violate any local laws. If you approach your local authorities in the right manner, they will co-operate with you. Showing them your MMA membership card and the Safety Code may help you. Read and study everything that you can find about rocket propellants, aerodynamics, and other associated subjects. Form or join one of the rocket clubs affiliated with the MMA. You'll have a lot of fun and learn something, too!

Most of all, remember that rocketry is a serious, scientific business. Keep your head and don't do anything silly. I'd rather see you stick around to live a while.



Members of the MMA watch while Del Hitch (MMA #3) explains the use of launching towers.

DESIGN CONTEST!

Send in your design for the membership button for the Model Missile Association and win \$5 plus a photograph suitable for framing of a guided missile launching!

Contest is open to all members of the MMA. Drawings should be made on a clean sheet of white paper, $8\frac{1}{2}$ " x 11". Deadline for all entries is 15 March 1958. Judges will be the Board of Trustees of the MMA, whose decisions will be final. All entries become the property of the MMA, and none can be returned.