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| Safe Work Procedure | | | | | new logo | | | |
| **Scope** | | | | | | | | |
| This document defines the Safe Work Procedure for setting up and launching model rockets. | | | | | | | | |
| **Application** | | | | | | | | |
| Launching model rockets for outreach programs for Binar. These model rockets are to be less than 500 grams with rocket motors with less than 25 grams of propellant and utilising C motors or smaller. | | | | | | | | |
| **Safety Hazards and Risk Controls** | | | | | | | | |
| **Hazard** | | | **Control Strategy** | | | | | |
| 1. Motor Explosion / Motor or Battery Fire | | | Ensure the area around the launch pad is clear of dry flammable material and either a type A fire extinguisher or bucket of water and bucket half full of sand is nearby. Must store the motors away from extreme heat, ignition sources or open flames. The storage area must also be secure, dry, and well-ventilated. | | | | | |
| 1. Toxic fumes | | | Ensure that launch is performed in a well-ventilated, open area. | | | | | |
| 1. Eye injuries | | | Use safety glasses should be used when operating near the launch rod. The launch rod will have a protective cap installed until the time of launch. | | | | | |
| 1. Hit by falling object | | | Rockets launched on an angle to launch them away from people and buildings. Rockets are equipped with parachute to control speed of decent. Operation launch procedures as per the attached NAR Model Rocketry Code (reference material line 1). | | | | | |
| 1. Slips and Trips | | | Participants of the launch must be aware of where the control wire. A cover should be placed over the wire to reduce the trip hazard. | | | | | |
| **Personal Protective Equipment (PPE)** | | | | | | | | |
| Appropriate personal protective equipment must be provided and used. (Tick as appropriate).  PPE must be appropriately selected, individually fitted and workers trained in correct use and maintenance: | | | | | | | | |
| **Safety  Glasses** | **Half face mask** | **Full face mask** | **Protective Gloves** | **Face Protection** | | **Hearing Protection** | **High**  **Visibility Vests** | **Protective Body Clothing** |
|  |  |  |  |  | |  |  |  |
| **Helmet** | **Long Hair contained** | **Footwear** | **Sunscreen** | **Sun aware clothing (Hat)** | |  |  |  |
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| **Roles and Responsibilities** | | | | | | | | |
| **Title** | **Role** | | | | | | | |
| 1. Launch Controller | Is the controller of the launch pad. They are to authorise a launch only when the launch pad is clear of people and the launch pad has been correctly set up. The launch controller must ensure that the 5-meter radius exclusion zone from the launch pad is maintained prior to and during launch. | | | | | | | |
| 2. Air space controller | The air space controller needs to ensure that no planes are above the launch site at any point during launch. They must relay this information to the launch controller **immediately**. | | | | | | | |
| **Procedure** | | | | | | | | |
| **Determining Suitability of the Launch Site** | | | | | | | | |
| 1. Simulate model rocket trajectory and take note of the maximum expected height. Refer to reference material line 5, however, you are not limited to this resource. | | | | | | | | |
| 1. Check the airspace of the proposed launch site on the VTC map (refer to reference material line 2) and ensure the model will not enter any restricted airspaces (using calculated maximum expected height). | | | | | | | | |
| 1. On the day of the launch check beforehand and ensure there are no fire bans present. Refer to reference material line 3. If there are then do not proceed with the launch. | | | | | | | | |
| 1. On the day of the launch check the wind speed of the launch site. Refer to reference material line 4. If the windspeed exceeds 32km/h then do not proceed with the launch. | | | | | | | | |
| 1. Ensure you have sufficient drinking water for the duration if the temperature is above 30oC. | | | | | | | | |
| 1. Ensure all participants have adequate amounts of sunscreen and are protected from the sun. | | | | | | | | |
| **Preparing Launch Pad and Auxiliary Equipment** | | | | | | | | |
| 1. Ensure the Camera and altimeter batteries are charged before launch day. | | | | | | | | |
| 1. Test camera and altimeter before launch day. Ensure they are functional and recording data. | | | | | | | | |
| 1. When operating on or around the launch pad ensure you always have safety glasses on. | | | | | | | | |
| 1. Ensure that the launch pad is placed on the upwind side of the launch site. The launch pad must launch the rocket at an angle (away from people and buildings, not greater than 30 degrees to the vertical). | | | | | | | | |
| 1. Once the launch pad is placed, ensure the safety cap is placed on top of the launch pad guide rod. Between rocket flights it is important to replace the saftey cap. | | | | | | | | |
| 1. Measure out a 5-meter radius circle from the launch pad as the exclusion zone when launching the rocket. Ensure that people stay outside of this area when the launch proceeds. | | | | | | | | |
| 1. Mark the launch site with at least 3 warning signs. These signs will advise people that may pass by that there are rockets flying overhead. | | | | | | | | |
| **Rocket Preparation** | | | | | | | | |
| 1. Fold up the parachute into the rocket body according to the instructions provided with the model rocket. | | | | | | | | |
| 1. Ensure rocket nose cone is secure enough that you can tip the rocket upside down and the nose should stay in place. However, loose enough that the secondary ejection charge can push the nose cone from the body of the rocket. | | | | | | | | |
| 1. Place the rocket motor into the rear of the rocket and ensure it is held in place securely via the metal clip. | | | | | | | | |
| 1. Insert the ignitor into the rocket motor nozzle. Push it all the way in until it stops and then put in the plug to retain the ignitor. | | | | | | | | |
| 1. Bend the ignitor leads away from each other to allow for the clips on the starter cord to be attached easily. | | | | | | | | |
| 1. Attach the altimeter to the rocket body. The camera can either be attached to the nose cone or the rocket body. Ensure they are working prior to flight. | | | | | | | | |
| 1. Measure and record the rockets mass. Check it against the mass utilised for the trajectory calculations. | | | | | | | | |
| **Launch Procedure (To be completed by the launch controller, unless otherwise stated)** | | | | | | | | |
| 1. Before launch can occur ensure that:   No planes are flying overhead (reference material line 6).  No clouds are present overhead.  The predicted rocket trajectory does not enter restricted airspace (reference material lines 2 and 5).  The launch pad exclusion zone is clear of people.  No fire bans are present (reference material line 3).  Windspeed does not exceed 32km/h (reference material line 4).  These conditions **MUST** be met at all times otherwise the launch cannot proceed. | | | | | | | | |
| 1. Remove the safety cap from the launch rod, ensure that safety glasses are worn during this operation. | | | | | | | | |
| 1. Guide rocket onto launch rod and ensure that the angle is less than 30 degrees to the vertical and pointed away from people and buildings. | | | | | | | | |
| 1. Attach the starter cord clips to the rocket motor leads. When unwinding the starter cord outside the exclusion zone of 5 meters (radius from launch pad) ensure the cord is not tangled. | | | | | | | | |
| 1. The air space controller must ensure that above is always clear of planes. If the airspace above the launch pad is not clear at any time, they must **IMMEDIATELY** inform the launch controller. | | | | | | | | |
| 1. The launch controller must ensure that the exclusion zone is clear of all personnel prior to launch. The exclusion zone must remain clear of all people prior to and during launch. | | | | | | | | |
| 1. The launch controller must push in the safety pin on the launch controls and then press the launch button to activate the rocket motor. It is advised that the launch controller provides a countdown to ensure everyone is aware of what is happening with the launch. | | | | | | | | |
| 1. If the rocket motor does not fire after the launch sequence has been followed, then it must be left for at least one minute on the launch pad. Refer to reference material line 1. | | | | | | | | |
| **Rocket Retrieval** | | | | | | | | |
| 1. When picking up the rocket ensure that you grab it from the body. Avoid picking it up from the rear near the spent rocket motor. | | | | | | | | |
| 1. Do not attempt to retrieve model rockets from any dangerous locations, refer to reference material line 1. | | | | | | | | |
| **Reference Material and Attachments** | | | | | | | | |
| 1. **NAR Saftey Code:** [**https://www.nar.org/contest-flying/u-s-model-rocket-new-sporting-code/model-rocket-safety-code/**](https://www.nar.org/contest-flying/u-s-model-rocket-new-sporting-code/model-rocket-safety-code/) 2. **Air Services Australia:** [**https://www.airservicesaustralia.com/aip/aip.asp?pg=10**](https://www.airservicesaustralia.com/aip/aip.asp?pg=10) **(you will need to select ‘AIP charts -> VTC -> Perth WA’)** 3. **DFES Total Fire Bans:** [**https://www.dfes.wa.gov.au/hazard-information/bushfire/total-fire-ban**](https://www.dfes.wa.gov.au/hazard-information/bushfire/total-fire-ban) 4. **BOM Weather Updates:** [**http://www.bom.gov.au/**](http://www.bom.gov.au/) 5. **Open Rocket Simulator:** [**https://openrocket.info/**](https://openrocket.info/) 6. **Ok2Fly Flight Radar:** [**https://ok2fly.com.au/?lat=-32.006695162507086&lon=115.89212938232629&map=street&query=0**](https://ok2fly.com.au/?lat=-32.006695162507086&lon=115.89212938232629&map=street&query=0) | | | | | | | | |
| **Authorisation** | | | | | | | | |
| **Approved for use by:**  **MANAGER/SUPERVISOR NAME: SIGNATURE: DATE:**  **Robert Howie 19 April 2023** | | | | | | | | |