

Comments and Rebuttal to TCRCM Runway Upgrade Proposal of July 28, 2022

Overview of proposal:

The History section presented a very bleak perspective of the current runway conditions implying that climate change combined with a short term loss of irrigation water caused irreparable damage to the grass runway that was causing significant damage to most model aircraft. It is implied that the condition of the runway is so bad that it needs to be replaced.

Response: The primary cause of the runway degradation was lack of water from the HRMC and it was not realized for a number of days. The new management of the HRMC did not fully understand their commitment to us for a reliable water supply. Hopefully that communication interface has been remedied. This has happened a few times over the 24 years that the modelers airport existed.

It is important that all understand the topography of our airport, and the characteristics of the soil that comprises it. Prior to this area being allocated for a flying site the north fence line was at the latitude location of the north side of the shade shelter with a very large gully that went down to the dirt road in the bottom of the existing gully. The entire pit area, pilot area, runway with overrun, and the outer grass on the north side of the runway is fill. The fill came from some hills/piles on the east side of the parking lot that was previously used as part of the old Jeep track. The jeep racing was deemed to dangerous by the COR which made their dirt piles available for our use.

Have any of you every wondered why you do not see any regular type of building structures in this area looking north until you get to some of the major Hanford nuclear facilities. The reason for this is the type and depth of the soil that exists on the ORV park and the adjoining Federal government property. The soil is a combination of 50% blow sand and 50% dirt, which is not very compactible and is highly permeable. One only has to look at the elevation of our north fence line, which has sunken nearly 4 ft., to understand the effect of water and ambient temperature cycling. The entire airport from fence to fence was initially at the same elevation as the shade shelter. This type of soil goes down from 50 to 80 ft, or more, before any type of clay type supporting composition can be found.

The maintenance of the runway needs to include releveling every couple of years and annual rolling to maintain the smoothness we desire for our models. A number of times in the past the best fix for the rough dead spots in the middle of the runway was to put in new sod. I believe the last time this was done was 2016 by Doug Larson and myself.

The most recent approach was the lowest cost option to save TCRCM money was to reseed and hope for the best weather. In hindsight the way the club is spending our reserve funds now we

should have put in new sod. It is important to note that the soil structure at the modeler's airport does not support strong root structure for our grass which is the prime reason for the slow recovery from damage.

Grass runways and flying sites have many positive attributes, although the current onslaught of the sales pitch for woven fabrics would have you believe something else. The majority of the radio control flying sites in this country are grass. These attributes include:

- Stability during takeoff making yaw control much easier.
- Cushioning to the model during landing
- Moderate friction to help slow models down when landing
- Minimizes damage to model during less than perfect landings.
- Allows for takeoffs and landings in moderate cross wind without damaging model
- Cool to the touch. The high conductivity of grass provides a cooler surface than the ambient air temperature.
- Does not usually need repair from one point arrivals.
- Safer to use than hard surfaced runways. The models are more readily kept under control.

There are also some performance limitations of grass runways which are:

- If the grass is too high models with small wheels and/or wheel pants may have some challenges.
- Is not compatible with most models that are 36" (0.8 m) or less in size.
- Tri-gear models that are configured such that they have high loads on the nose gear during takeoff will likely encounter problems if the elevator cannot create sufficient lift to minimize this effect. This includes ducted fan models and high wing trainers that have down thrust with a landing gear configuration that does not provide a nose up attitude during takeoff. Some specialty models need to be flown from pavement.

Technical Perspective of proposed TCRCM Runway Upgrade

- The composition of US 230 woven fabric is a large polypropylene diameter monofilament fiber, similar to the polyester fibers in tires, but is extruded at a lower temperature in the range of 400 F. The elongation at failure is 15% which means it is of low ductility compared to other polymers. **Note: low ductility means low shear strength = easily punctured and cut.**

- The melting point is in the range of 250 – 340 F and the flash point is 600 F. **Note: the exhaust gas temperature of 2-stroke glow model engines is 350-400 F, 2-stroke gas model engines is 450-500 F, and turbine powered models is 700-800 F.**
- The ultraviolet resistance is 90% at 500 hours. That means that after 500 hours of high UV exposure the fiber starts to embrittle. This is somewhat confusing as in our area we have UV exposure most months of the year but is highest May through September. For our area 500 hours of exposure is close to one year and we should expect that after 4 years of use the fabric would need to be replaced.
- Absorptivity/Emissivity capability is moderate resulting in surface temperatures that will be significantly higher than ambient on a sunny day. Estimate that on a 100 F day that the surface temperature will be ~133 F.
- Surface Condition has a very low friction factor that compares to the tarp you get from Harbor Freight. If damp it will be difficult to walk on.
- Integration with grass field: The project execution plan assumes a stable boundary and platform for the fabric. Given the soil at the modeler's airport the interface with the grass surrounding the fabric will not be stable. The irrigation guns, wind, and the continual contact with the mower will cause significant degradation.
- Cost and Labor Estimate: The costs are very high for a park flyer/ducted fan specialty runway . No costs are given for labor, and given the average age of our club, which is near 65, expecting the membership to perform all the preparation and installation given all of the other commitments is beyond reasonable.

Cost Basis for the Upgrade and Funding Source

The proposed upgrade initial cost is ~\$8000, which is a significant amount of funds. Who is supposed to be covering the costs for this Field of Dreams Park Flyer Upgrade? Only a handful of relatively new members are sponsoring this upgrade. Besides the initial costs it increases the annual field maintenance required reserve by ~\$2000 given the short replacement interval and the continual repair that is going to be required. All of the reserve funds of the club have come from pattern/ IMAC contests and membership dues. If this is something that is needed those members who are supporting it should be asked to provide the funds for the upgrade. The proposed upgrade will cause in a significant increase in the cost of maintenance for decades into the future.

Compatibility of the upgrade for all types of TCRCM model aircraft:

The proposed upgrade is not compatible with any of the piston engine powered models with exhausts that exit down. The high temperature of the exhaust will cause melting of the surface.

Notice that all of the videos of model aircraft runways using the fabric show small electric models, not any of the larger models that most of us fly. The fabric is very susceptible to damage from nose overs and prop strikes, which happens very frequently with the more inexperienced park flyer pilots. The fabric is very difficult to taxi on due to the very smooth low friction surface, which requires a very low idle and careful power addition during takeoff.

The fabric runway will not be conducive for landing of gliders and other high speed buzz bombs that do not have landing gears. The low shear strength could very possibly be damaged by landing of these types of aircraft.

Locating the fabric runway in the middle of the flying site negates the use by IMAC and Pattern aircraft to use our flying site. The ducted fan flyers will also have a challenge landing and keeping their aircraft on the runway. Only a few of them have the skills to accomplish a successful landing.

There has been a change in the types of models available. Models with a built up structure of wood are expensive, and none are constructed in this country. The larger IMAC and Pattern models are all constructed overseas, and the modeling market is flooded with lower cost smaller foam models from China. Most of the models from China are the smaller prebuilt type and easy to prepare for flight. They are not durable, and some are cheap enough to be disposable. Many of these are in the 1.2 m size or smaller.

Membership Model Type(s)

What types of models do our membership have and how much does the current condition of our field limit their ability to enjoy our fantastic hobby? These are the questions that need to be asked before such a proposal for a major change to our flying site that has far reaching impacts be presented to the membership. No flying site can ever be a cure all for the various interests of all modelers.

TCRCM current financial Burden

The most recent expenditures for the mower and Conex storage container has decreased TCRCM's funds available to a minimum level that should not be decreased to a lower level. This is prudent business philosophy that has been employed since the inception of our club. From my perspective the club has over committed its ability to prudently put these purchases into operation. The Conex box is going to need significant expenditures to make it operational along

with the clubs share of the costs to build and implement the additional starting tables and charging stations. The runway still needs significant work to repair the degradation that has occurred. No further cost obligations should be incurred until the current commitments are satisfied and functional.

Alternate Proposal for Improving Runway Use Performance

The runway condition has definitely degraded the last few years for various reasons. Prior years the runway was maintained smooth and flat and mowed to a grass height of a putting green. The problems started when the modified Craftsman Runway mower wore out and broke down to a point that was not repairable.. The Cub Cadet mower would not mow low enough to satisfy the need of many of our models. At about the same time my health degraded that has required multiple surgeries and I did not communicate with Bob Anderson and his amazing maintenance team what was happening to the runway. Every year the field goes through continual landscape changes that are somewhat unnoticeable to most of use. One only has to look at the height of the north fence line which had sunken 4 to 5 ft. over the last 10 years. More near term just notice how much the east end of the Conex box has sunken since placement in June. Those are all clues as to what the geological characteristics of our modeler's airport. The following are my recommendations as to what needs to be done to bring our runway back to a level that will accommodate a larger variety of model aircraft:

- Sod the dead spots in the center of the runway
- Roll the runway using the roller that was designed and constructed for this purpose.
- Identify the low areas of the runway where significant settling has occurred.
- Carefully mow the runway at the lowest height possible and try to avoid the areas that would be scalped.
- Put clean sand (with no rocks or pebbles) on the runway and place a little extra on the low areas.
- Roll the runway again.
- The above needs to be completed prior to the irrigation water shutoff

This may not be the perfect sequence but hopefully provides a starting point for discussion.

The above comments and discussion is respectfully submitted as per the request of Jim Anderson at the TCRCM club meeting on August 17, 2022

