



Crumb rubber as a topdressing for high traffic areas: ...and now the rest of the story.

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Topdressing with crumb rubber, applied in the same manner as any other topdressing, can dramatically reduce the abrasive action caused by the nature of athletic activity. With a greater surface area and rounder edges compared to sand, the crumb rubber is able to protect the crown tissue from traffic while still providing a smooth and uniform playing surface. Crumb rubber topdressing can also improve turfgrass color and reduce compaction thus improving the playing quality and aesthetics of the playing surface.

A trial plot was established on an 80% sand: 20% peat mix at the Hancock Turfgrass Research Center at Michigan State University, East Lansing, Michigan on 29 July 1993. The objective was to determine optimum topdressing rates for high traffic areas, especially for high school athletic fields and playgrounds. Crumb rubber was topdressed in a 2x5 randomized complete block design with three replications. There were two levels of crumb rubber (10/20 mesh and 1/4" size) and five treatment amounts (0.0", 0.05", 0.10", 0.125", and 0.25" of crumb rubber added to the turf surface). Crumb rubber was topdressed on 29 July, 11 September, and 5 October with a Scott's rotary spreader and then dragged into a Lolium perenne (Perennial ryegrass) and Poa pratensis (Kentucky bluegrass) turfgrass stand. Treatment areas were 10' x 12'. The rubber particles quickly settled down towards the soil surface, protecting the crown tissue area. The rubber stayed at the soil surface because of its relatively light weight or a lower particle density: rubber's particle density is 1.2 g/cc versus soil particle density being 2.65 g/cc, on average. Crumb rubber helps to reduce impact absorption and soil compaction while improving turfgrass density and quality.

Wear treatments were applied by the Brinkman Traffic Simulator (BTS). Two passes by the BTS are equivalent to the traffic experienced in one football game within the hashmarks between the forty yardlines. In the autumn of 1993 and 1994, 98 football games were simulated over a 170 day period.

While much data were collected throughout the 1993 and 1994 seasons, due to spatial constraints, only the most important points will be discussed. Turfgrass density and quality ratings provided substantial evidence that turfgrass conditions were maintained despite intense traffic

when crumb rubber was applied as a topdressing. Impact absorption values (G_{max}) were significantly lower at the higher crumb rubber rates in 1993 compared to lower amounts of crumb rubber and the control plots without any crumb rubber. While this phenomenon did not continue in 1994, surface hardness characteristics, duration of impact (Tt), time to peak (Tp), and the rebound ratio (rr%), showed the effectiveness of crumb rubber (0.75") in providing a softer, more resilient surface. In 1993, shear values decreased significantly as crumb rubber levels increased due to the crumb rubber remaining in the turf canopy and not settling down to the soil surface. Consequently this prevented the shear apparatus from being properly positioned within the turf/soil layer, thus the lower measurements (much like when a player "digs in" for traction). In 1994, as the crumb rubber continued to settle down to the turf/soil interface, shear levels increased significantly and stabilized.

Surface temperatures were significantly higher as crumb rubber levels increased for both years. This effect could promote earlier use of the fields in the spring due to continued turfgrass growth during the autumn and early spring. Furthermore this phenomenon also reduced Poa annua encroachment.

Although crumb rubber is an excellent tool, it is not a "cure-all". The use of crumb rubber cannot be an exclusive means for maintaining turf in any high traffic areas, and must be used as a tool integrated into the management program. We recommend the field manager have a 100% turfgrass stand, or close to this as possible, before making any crumb rubber applications. Our results show that topdressing between 0.375" and 0.75" depth (not more than 0.25" at any given application) is the ideal range for protecting turf in many types of high traffic areas.

A cost breakdown of 1000ft² for annual re-establishment of an area versus topdressing crumb rubber an initial one time can provide an idea of the relative costs associated with each process. This is only an estimation of the costs, however it does provide an idea of the savings that can be attained over an extended period of time (Table 1).

Table 1. Estimated costs to re-establish a 1000 ft² area annually versus a one-time topdressing with crumb rubber at 0.75 inches over a five year period.

Items	Re-establishing	Topdressing Crumb Rubber
Seed, fertilizer, labor, aeration, watering, and seedbed preparation for one year.	\$400	\$400
Topdressing crumb rubber at 0.75" (1800lb. x \$0.20/lb.)	\$0	\$360
Re-establishing annually four more years at \$400/year.	\$1600	\$0
Miscellaneous costs	\$200	\$200
Total	\$2200	\$960

* Prices are an estimation of costs and do not include equipment or inflation.