

2006 PRODUCT ENGINEERING INTRODUCTION

- The name **emtek** stands for Engineered Mat Technology.
- The basic premise behind the product is to provide a better mat through engineering.
- Because of this premise our approach to the market is through engineering.
- Engineering drives consistency, reduced weight, flexibility, and **COST SAVINGS**.

The values below are the basic design properties that we use to design specific critical applications such as deflection sensitive crane picks, clear spans (bridging), and extremely heavy loads over utilities, etc. These properties are also the basis for the loading tables that we have published in our Design Guide at www.anthonycposites.com.

emtek Design Properties

$$\left. \begin{aligned} F_b &= 4123 \text{ psi} \\ F_v &= 379 \text{ psi} \end{aligned} \right\} \text{ W/ 1.33 Load Duration Factor}$$

$$E = 1.6 (10)^6 \text{ psi}$$

Unit Section Properties

No	Size t x b	A In ²	I In ⁴	S In ³	M _A K-Ft	V _A K
1	3.5" x 12"	42	42.875	24.50	8.418	10.612
2	4.5" x 12"	54	91.125	40.50	13.915	13.644
3	5.5" x 12"	66	166.375	60.50	20.787	16.676
4	6.5" x 12"	78	274.625	84.50	29.032	19.708
5	7.5" x 12"	90	412.875	112.50	38.653	22.740

$$A = t(b) \quad I = \frac{bt^3}{12} \quad S = \frac{bt^2}{6} \quad M_A = F_b S \quad V_A = \frac{F_v A}{1.5} \sim \left(\frac{FV \text{ lb}}{Q} \right)$$

K = KIP = 1000 lbs

M_A = Allowable Moment W/1.33 Load Duration Factor

V_A = Allowable Shear W/1.33



Drill site being prepped with **emtek** mats.

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These values have been developed through intensive laboratory testing both during the initial product development stage at the Advanced Engineered Wood Composites Center at the University of Maine (www.aewc.umaine.edu) and on a continuing basis at the Forest Products Laboratory at Mississippi State University. We have broken in excess of 800 beams. (http://www.cfr.msstate.edu/generalinfo/facilities/forest_products/).



Daily destructive tests are performed on the product as part of our continuous quality control.

In addition each billet (the 1' wide laminated composite element that is bolted together to make the mats) is proof loaded after machining and drilling operations. During the proof loading process each billet is loaded to 150% of the allowable design load. For example if we publish load tables that allow the engineer to apply a 20,000 lb load to a 4.5" thick by 4' wide mat that is spanned over an 11' clear span, we load the mat to 30,000 lb prior to leaving our manufacturing facility. All product is proof loaded to 150% of allowable design value.



Machining Process



emtek mats provide a stable base for a heavy crane and protect underground utilities.

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Proof Loading Process

The load tables that are in our Design Guide are based on a one foot wide section of mat. This is because of the variable width mats

that we produce (1'-8'). Multiplying the width of the mat by the allowable load will give you the total allowable load when distributed across the mat. Different soil conditions and equipment will distribute loads in different ways. The design guide accounts for three separate soil conditions as well as a number of different load configurations, and allowable deflections.

It is difficult to make a general statement about the strength and deflection of our product compared to the three-ply nail-laminated mats on the market because the three-ply product is not manufactured in a manner that controls the strength or stiffness criteria of the product. Also the nature of assembly in the three-ply product is such that continuous use significantly changes the performance of the three-ply product.

We can compare our product to National Design Standards (NDS) for solid wood timbers and make the statement that we can substitute our product at half the thickness against a timber mat on a strength basis. For example we could substitute our 5.5" product for a 12" timber mat, and our 4.5" product for 8" and 10" timber mats and hold equal loads. If you have an example of the equipment and application we would be more than happy to tell you what to expect from the performance of our product. We routinely do this for critical applications (generally at no charge).

Our engineering sets us apart from other products at the point of sale, but our durability has made believers out of long term users. We have had product in continuous use for over three years in logging applications with 15,000 trips across the product, as well as accounts of 100% recovery on pipeline operations (when natural timber mats exhibited 50% loss).



emtek mat's durability and longevity can be attributed to our engineering and hardwood characteristics.



emtek mats provide a durable surface for an access road in Alberta.

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Mat surface after 18 months
of continuous use under
skidder chains.



emtek mats makes poor soil conditions workable at a construction site.

I look forward to answering any questions you might have in regards to **emtek** products or our company.

Sincerely,
Paul Hancock

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