# Problems Persist, But Continuous Band Track Shows Promise in Light Armor Applications

**by Paul Hornback**

The U.S. Army continuously seeks to reduce operating and support (O&S) costs for fielded combat systems while developing future combat systems that exhibit ultra high reliability with lower maintenance requirements. As the Army evolves from Army of Excellence (AOE) to Force XXI and beyond, we must achieve increases in force sustainability without sacrificing critical mobility, lethality, and survivability attributes. This remains a formidable task for legacy tracked combat systems, and will be a challenge for future systems unless we adopt changes in track design and materials.

It has long been an accepted fact that tracked vehicles provide a stable weapons platform with excellent all-weather mobility over a wide range of terrain.[1] However, the superior mobility of tracked platforms has traditionally incurred a substantial cost penalty. Historically, steel-tracked vehicles have higher O&S costs than wheeled combat platforms.[2] The higher O&S costs are directly attributed to the rougher terrain profile characteristic of tracked vehicle employment (tracked vehicles endure a greater percentage of cross-country mileage than wheeled vehicles)[3] as well as the maintenance burden imposed by their track and suspension systems. Furthermore, steel tracks inherently produce vibrations that adversely impact the reliability of onboard electronic components, contributing to even higher O&S costs.

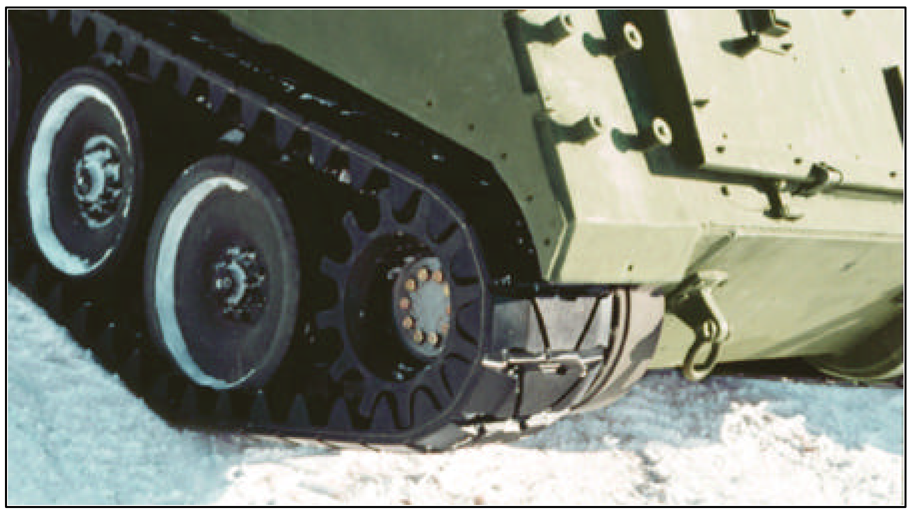
Continuous band track technology is not new and currently exists on Caterpillar 30/30 tractors, agriculture tractors (where soft soil mobility is critical), Small Unit Support Vehicles (like the Finnish SISU NA-140 all-terrain articulated vehicle) and Light Weight Trailers. The U.S. Army Tank-automotive and Armaments Command (TACOM) has awarded Caterpillar a contract option for producing the Deployable Universal Combat Earthmover (DEUCE) equipped with a continuous rubber track. Rubber track was selected to reduce Gross Vehicle Weight (GVW), thereby enhancing DEUCE deployability. The DEUCE can be parachuted into a combat zone and, thanks to its rubber tracks, can travel at speeds of up to 30 mph, permitting self-transport rather than truck/trailer transport.[4] A rubber track system has also been developed, tested, and approved by the Canadian Department of National Defence for the Hägglunds BV206 vehicle, with test results indicating three times the life of the original Swedish-supplied track.

Manufacturers, like Soucy International, claim continuous band tracks provide enhanced on/off road mobility through reduced ground pressure, better traction and lateral stability; reduced platform vibration, noise, radar/acoustic signatures, weight, and rolling resistance; improved track life; corrosion and maintenance-free operations; and lower life cycle costs.[5]

The U.S. Department of Defense and U.K. Ministry of Defense (MOD) have recently experimented with continuous band track on lightweight armor platforms. The continuous band track (commonly referred to as rubber track) is an endless, synthetic rubber molded track with internal drive system. The molded track is reinforced with Kevlar, nylon, polyester and/or glass fiber to provide rigidity and increased track life. Both the U.S. and U.K. are interested in determining the feasibility and military performance enhancements resulting from continuous band track on armored combat platforms.

To verify the purported benefits of continuous band track, the U.S. Army evaluated an experimental band track on the M113A3 armored personnel carrier while the U.K. experimented with a similar track on a Combat Vehicle Reconnaissance (Tracked) (CVR(T)) platform. U.S. and U.K. test reports noted the following significant results:

- M113A3 paved surface rolling resistance for the band track was 67% less than the current T130 track. No significant difference was noted for operations in sand.[6]
- A 1,600-pound weight reduction was realized on the M113A3 equipped with band track as compared to the T130 track.[7] On the CVR(T), the weight saving was 30%.
- M113A3 internal and external noise levels were 6 dB lower for the band track than for the T130 track.[8]
- The CVR(T) with band track achieved a 50% reduction in platform vibration.
- M113A3 band track durability (the point at which track separation occurs) was approximately 4,700 kms when tested over 20% primary (paved) roads, 40% secondary (gravel) roads and 40% cross-country at a 12 tons GVW.[9]
- Maintenance events for the M113A3 band track system included two drive sprocket replacements, two track throws (the same track was reinstalled), one idler wheel replacement, and three incidents where multiple wheel studs required tightening.[10]



**Detail view of the continuous band track installed on an M113 APC during recent tests.**

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- Installation procedures are cumbersome at best and require lifting one side of the vehicle off the ground (a logistics problem for replacement in the field).[11]

Challenges that must be overcome include battlefield repairs (short tracking), ease of installation, sprocket durability, and heavier GVW applications. Additional testing has been conducted on the M113A3 uploaded to 15 tons with positive results. TACOM is also planning to evaluate band track on a 25-ton Bradley Fighting Vehicle during 1999. Soucy is in the final design stage of a battlefield repair kit and Alvis Vehicles Ltd. (the CVR(T) manufacturer) is examining air bags to lift the CVR(T) thereby enhancing installation/battlefield repair.

**Conclusion.** Continuous band track offers the potential to reduce platform vibration, internal and external noise emissions, track weight, and platform maintenance. These benefits directly translate to higher reliability and availability, stealthier platforms, increased payload capacity, reduced GVW, greater mobility, and lower O&S costs. While the current focus has been on retrofitting existing tracked vehicles, the high payoff may occur on future combat systems where band track technology can be engineered into the overall design scheme. Although further evaluation is required, continuous band track has demonstrated the potential to meet future standards of increased force sustainability while maintaining critical mobility characteristics for both legacy and future lightweight tracked combat systems.

### Notes

[1]"Wheeled Versus Track Vehicle Study, Final Report," Studies and Analysis Activity, Headquarters U.S. Army Training and Doctrine Command, Fort Monroe, Va., March 1985, 1-68.

[2]Ibid, 1-86.

[3]Ibid, 1-76 and 1-86.

[4]Army RD&A, "TACOM Awards DEUCE Production Contract," November-December 1996.

[5]Soucy Web Page, Military Applications. Online. Available @ http://www.soucy-group.com/web/International/Emilitary.htm. 6 November 1998.

[6]"Summary Test Report of the Experimental Band Track for the M113 Armored Personnel Carrier," Wayne Lucas and Kenneth D. Scott, Yuma Proving Grounds, Yuma, Ariz., May 1997, 2.

[7]Ibid, 8.

[8]Ibid, 10.

[9]Ibid, 6.

[10]Ibid, 13-15.

[11]Ibid, 6.

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