

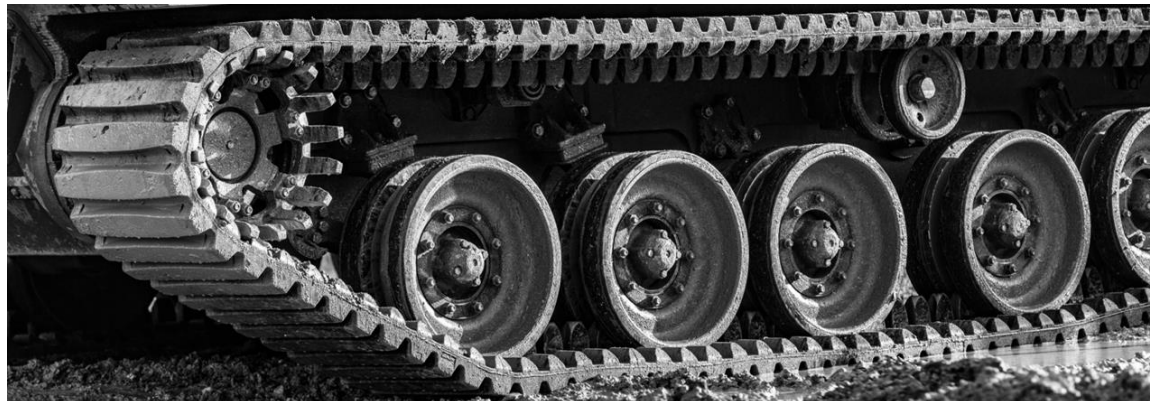


COMPOSITE RUBBER TRACK TRIAL RESULTS FOR WARRIOR IVF

Tommy Marcotte

Defense Engineering Director

Soucy International





INTRODUCTION

- **Armoured Trials and Development Unit (ATDU)** conducted a private venture trial on behalf of **Soucy Defense**, sponsored by the **Head of Capability – Ground Manoeuvre**.
- Trial aim: **build United Kingdom Ministry of Defense (UK MoD) confidence in Composite Rubber Track (CRT) technology** by validating performance claims, in order to inform future Armoured Vehicle Programme (APV) capability decision.
- Objective: Trial of 3107 miles (5,000 km), broken into 10 BFM of 311 miles each.





Variant 510
60,000 lb



CRT TECHNOLOGY – BENEFITS ON WARRIOR

WEIGHT



37% reduction in track weight

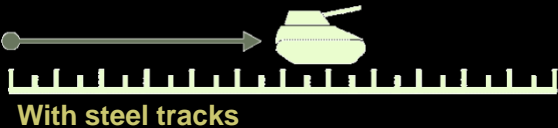
FUEL ECONOMY



28% fuel savings

RANGE

28% increased in range



NOISE



Mean noise reduction of 53%

VIBRATION



Mean vibration reduction of 40%

DURABILITY



Up to 5,000 miles

MAINTENANCE



Savings of 134 maintenance hours per 1000 miles





WEIGHT REDUCTION



WEIGHT REDUCTION

Power & Mobility



Composite Rubber Track
(CRT) Kit weight saving of
3.306 LB
(-5% **GVW** in average)



When **submerged in water**,
CRTs are **79% lighter** than
steel tracks



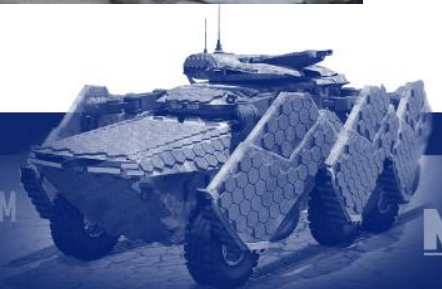


ADTU TRIAL





- The CRTs were **removed** and **replaced** by the crew in both the **work shop** and in **the field**.
- It took the untrained team **2.5 hrs** to complete the task by hand in both instances.



10 BATTLEFIELD MISSIONS

Power & Mobility



2 Months of intensive testing (80 miles / day):

- **28 % on track**
- 42% on road
- 30% Cross-country



3107 MILE TRIAL

Power & Mobility



2 Months of intensive testing (80 miles / day):

- 28 % on track
- **42% on road**
- 30% Cross-country



GVSETS GROUND VEHICLE SYSTEMS ENGINEERING & TECHNOLOGY SYMPOSIUM
& ADVANCED PLANNING BRIEFING FOR INDUSTRY

NDIA
Michigan

3107 MILE TRIAL

Power & Mobility



2 Months of intensive testing (80 miles / day):

- 28 % on track
- 42% on road
- **30% Cross-country**



GVSETS GROUND VEHICLE SYSTEMS ENGINEERING & TECHNOLOGY SYMPOSIUM
& ADVANCED PLANNING BRIEFING FOR INDUSTRY

NDIA
Michigan



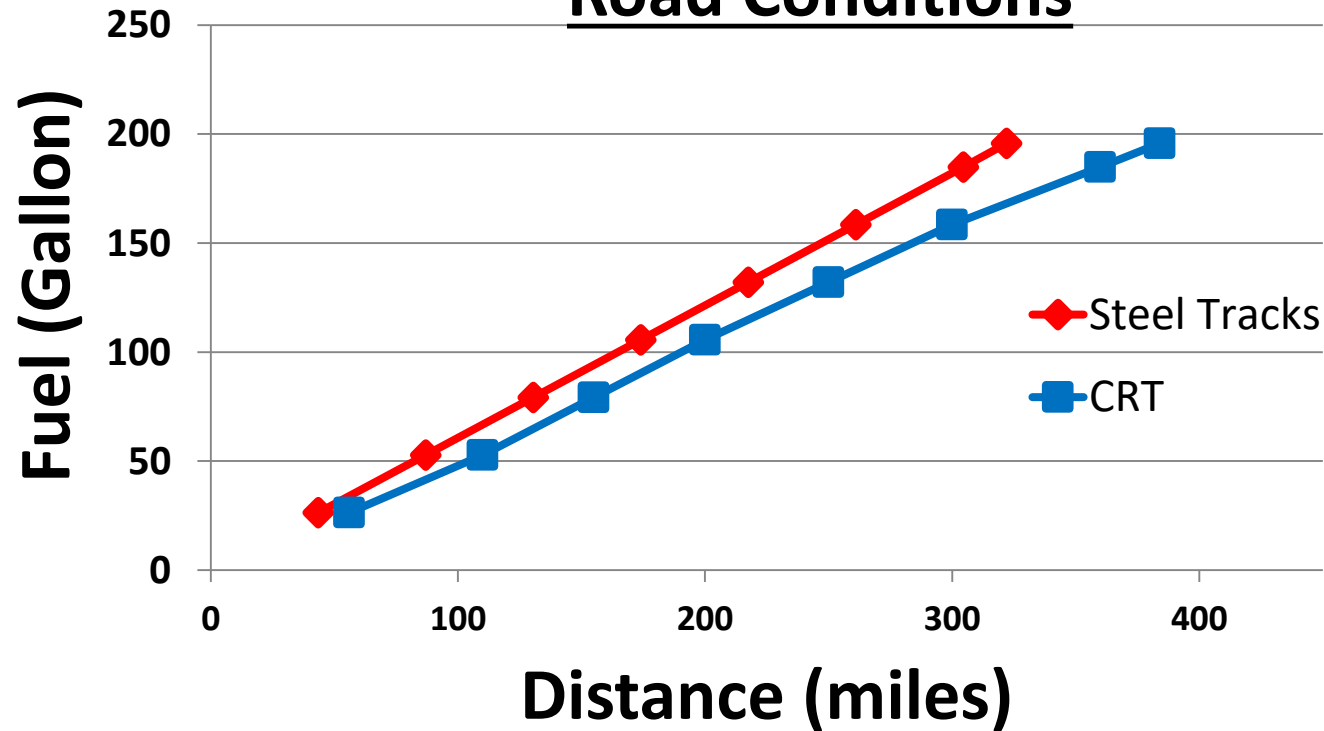
FUEL CONSUMPTION





VEHICLE RANGE - ROAD

Distance Travelled with One Fuel Tank Road Conditions



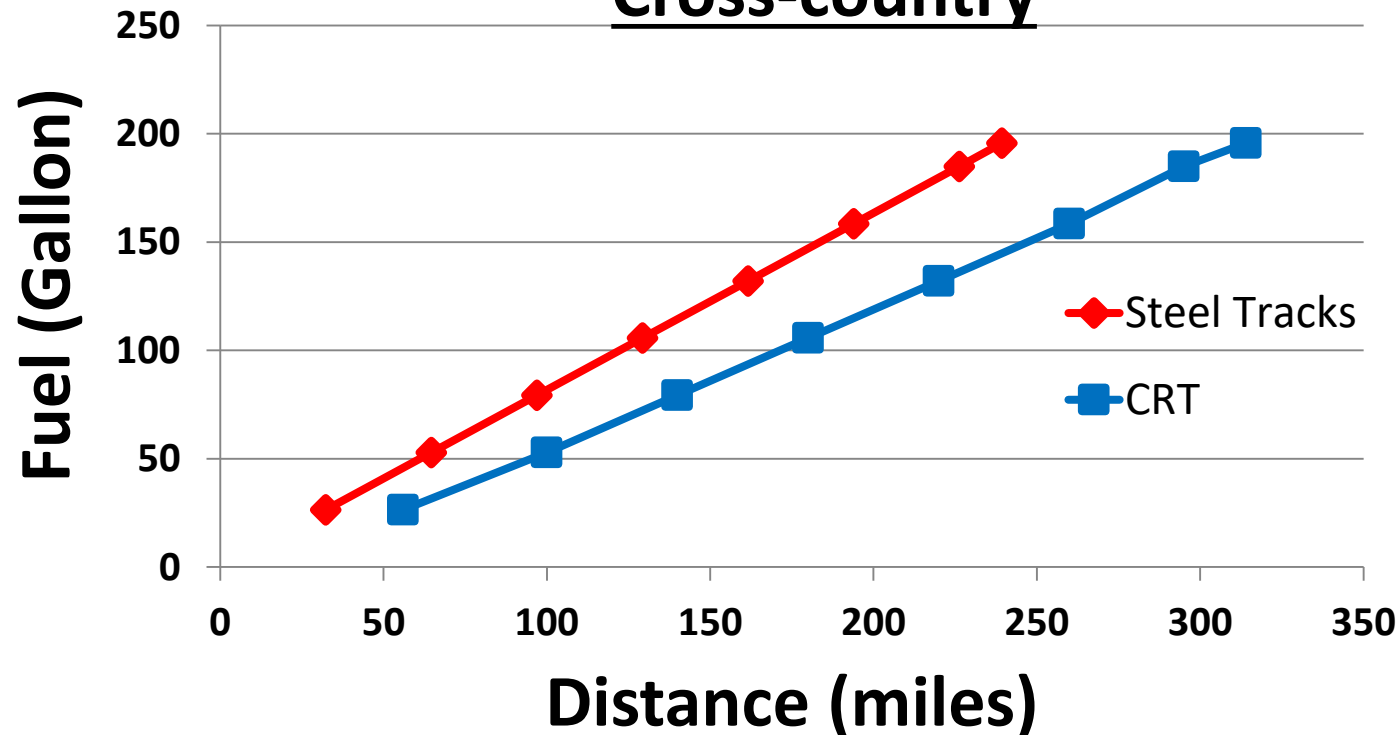
Vehicle range
increase of 19%
on road





VEHICLE RANGE - CROSS-COUNTRY

Distance Travelled with One Fuel Tank Cross-country



Vehicle range
increase of 31%
in cross country





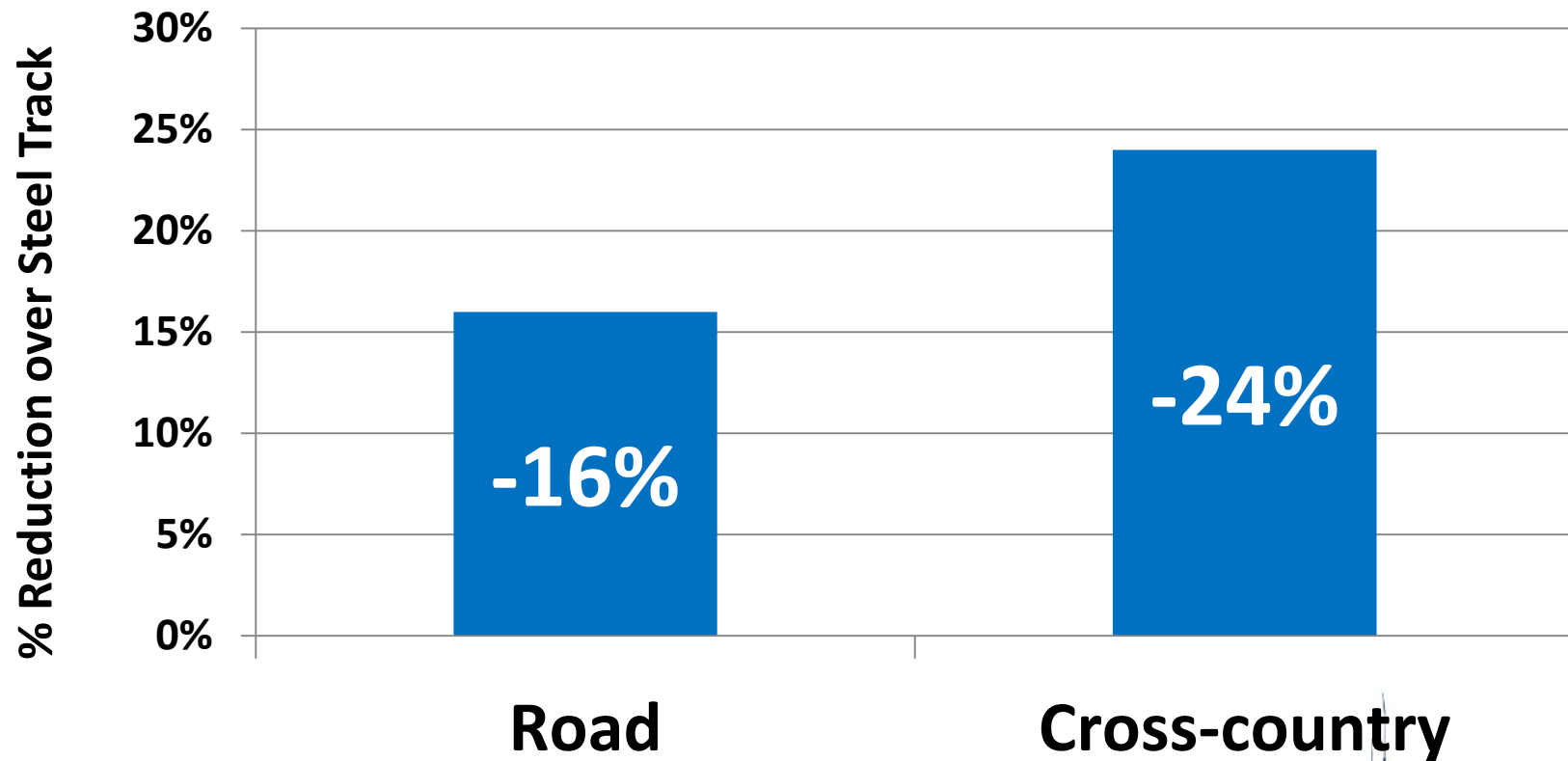
VEHICLE RANGE

Assuming 25% road and 75% cross-country the CRT allowed the vehicle range increase from **260 mile to 332 mile (+ 28%)**





CRT Fuel Consumption VS Steel Track

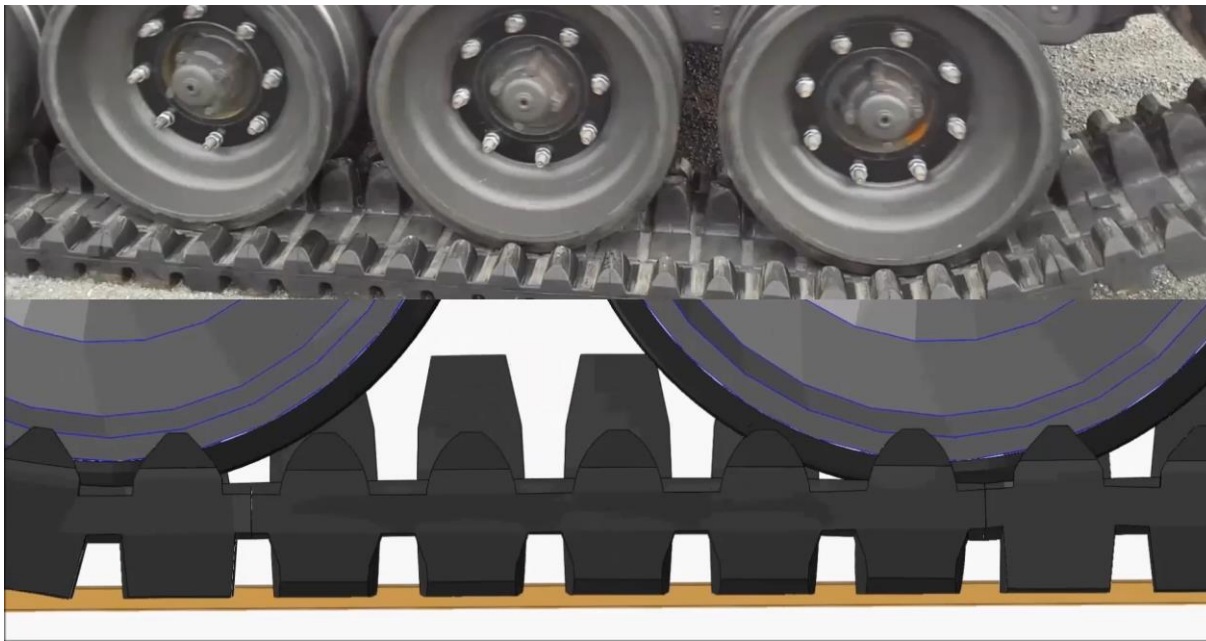




FUEL CONSUMPTION – “Snake Effect”

Low rolling resistance = low fuel consumption, thanks to:

- Reduction of the rubber compound hysteresis
- Reduction of the weight and inertia
- Reduction of the “snake effect”





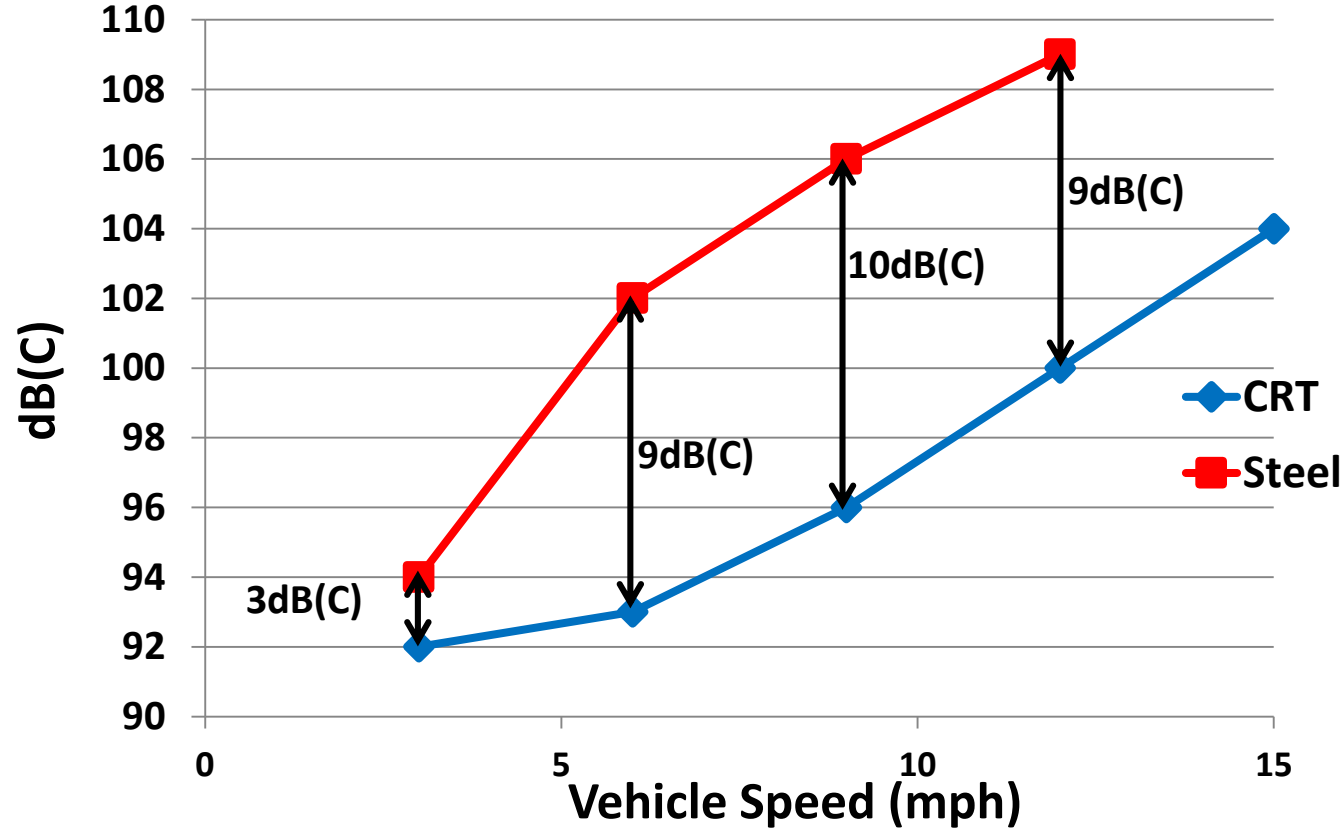
NOISE REDUCTION





NOISE REDUCTION

Cross-country (Hatch closed) - Crewstation



Average
reduction of
7.75dB(C)

JSF2382 NPRIME Report

GVSETS

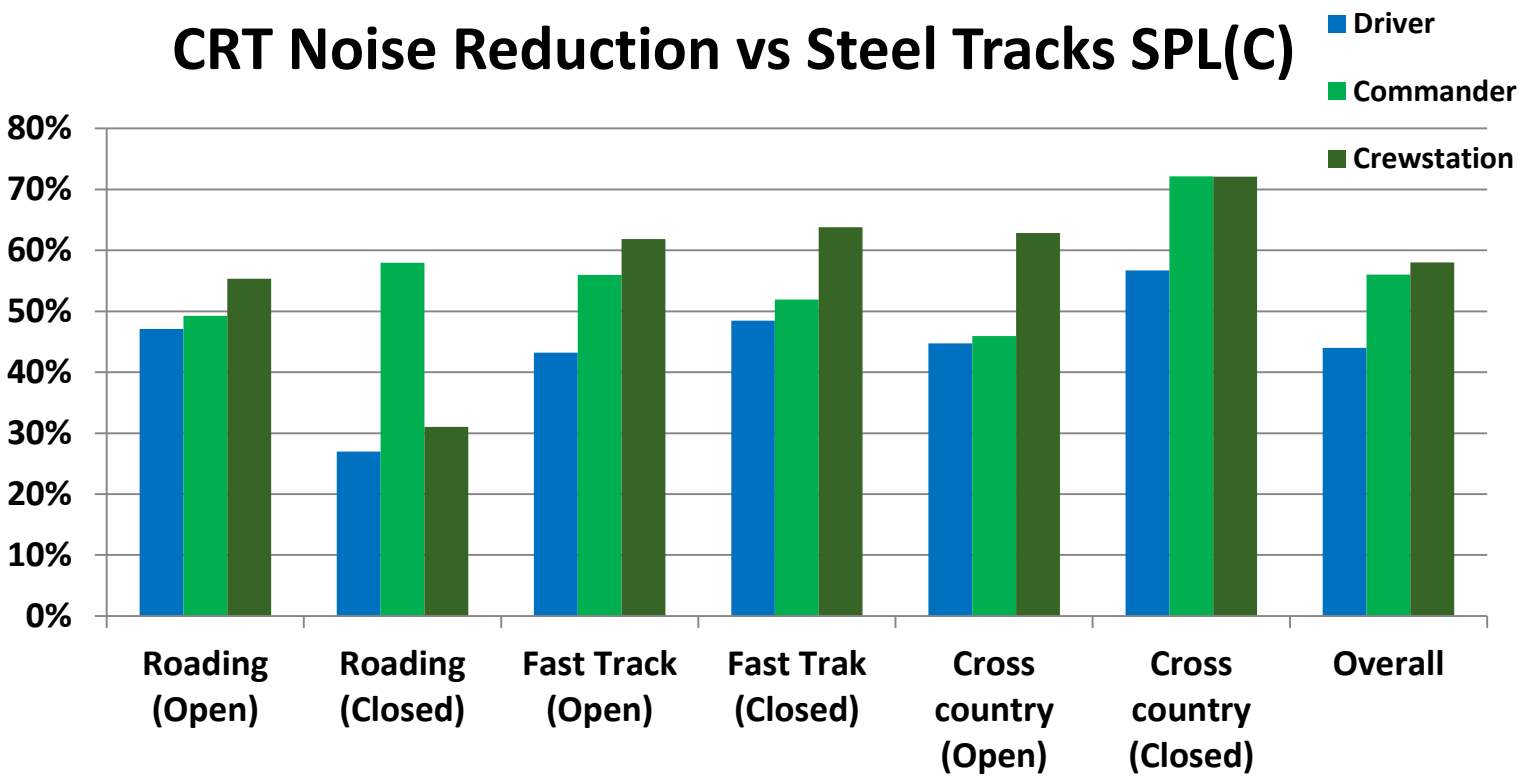
GROUND VEHICLE SYSTEMS ENGINEERING & TECHNOLOGY SYMPOSIUM
& ADVANCED PLANNING BRIEFING FOR INDUSTRY



NDIA
Michigan



CRT Noise Reduction vs Steel Tracks SPL(C)



Average reduction of **53%**

JSF2382 NPRIME Report





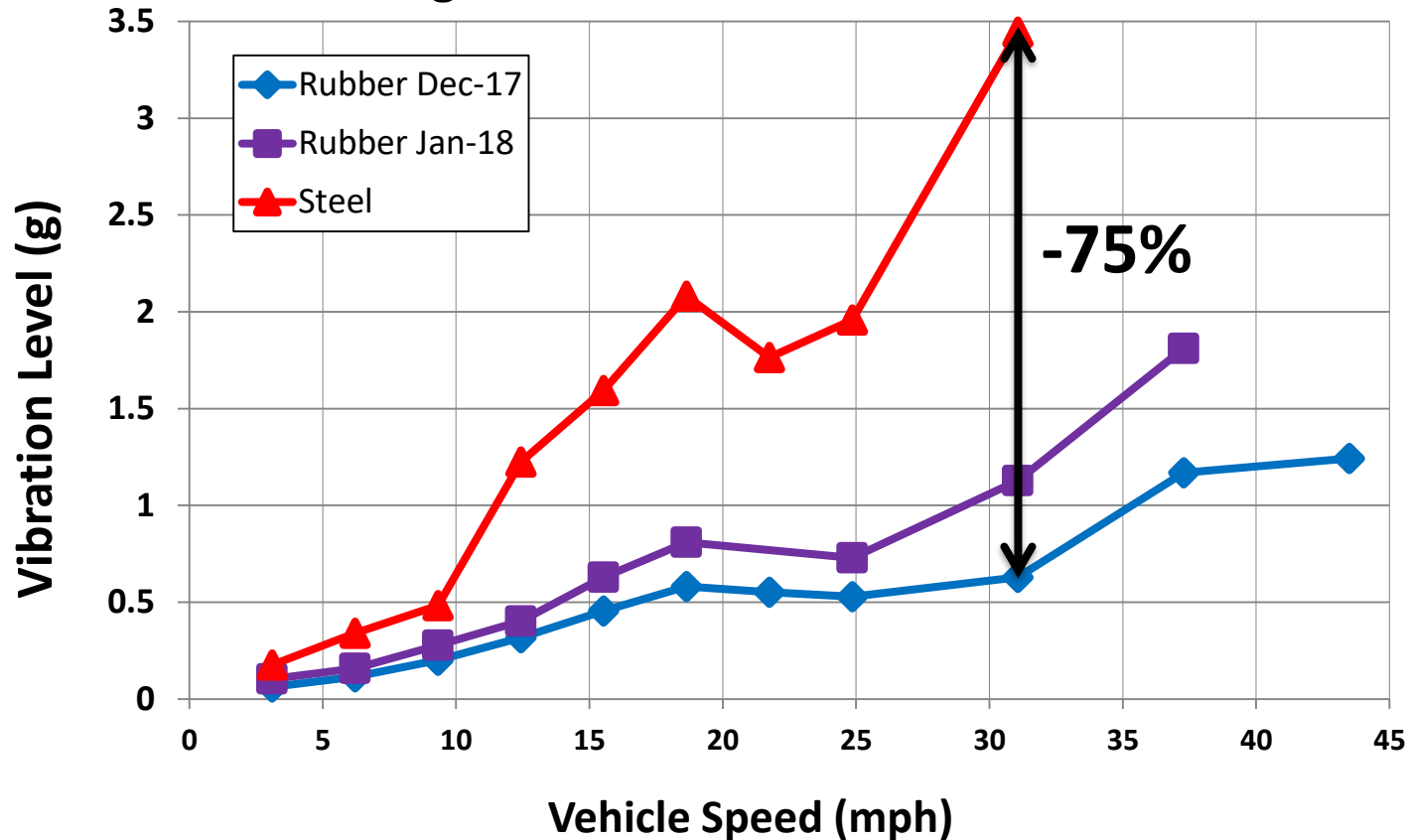
VIBRATION REDUCTION





VIBRATION REDUCTION

Unweighted RMS - Rear Crew Seat Pad



**Up to 75%
vibration
reduction
at 31 mph**

JSF2382 NPRIME Report



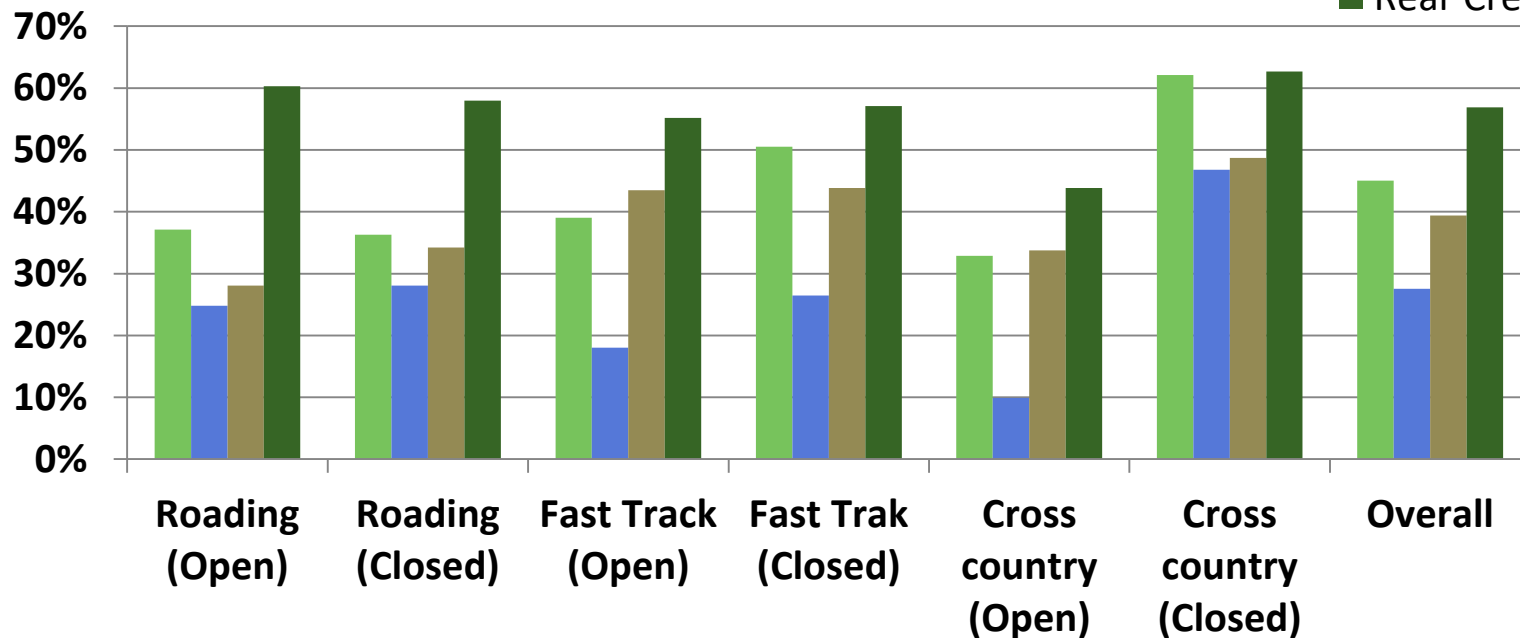


VIBRATION REDUCTION

CRT Vibration Reduction vs Steel Tracks (g)

- Commander
- Driver
- Gunner
- Rear Crew

**Mean
reduction
of 40%**



JSF2382 NPRIME Report



GVSETS

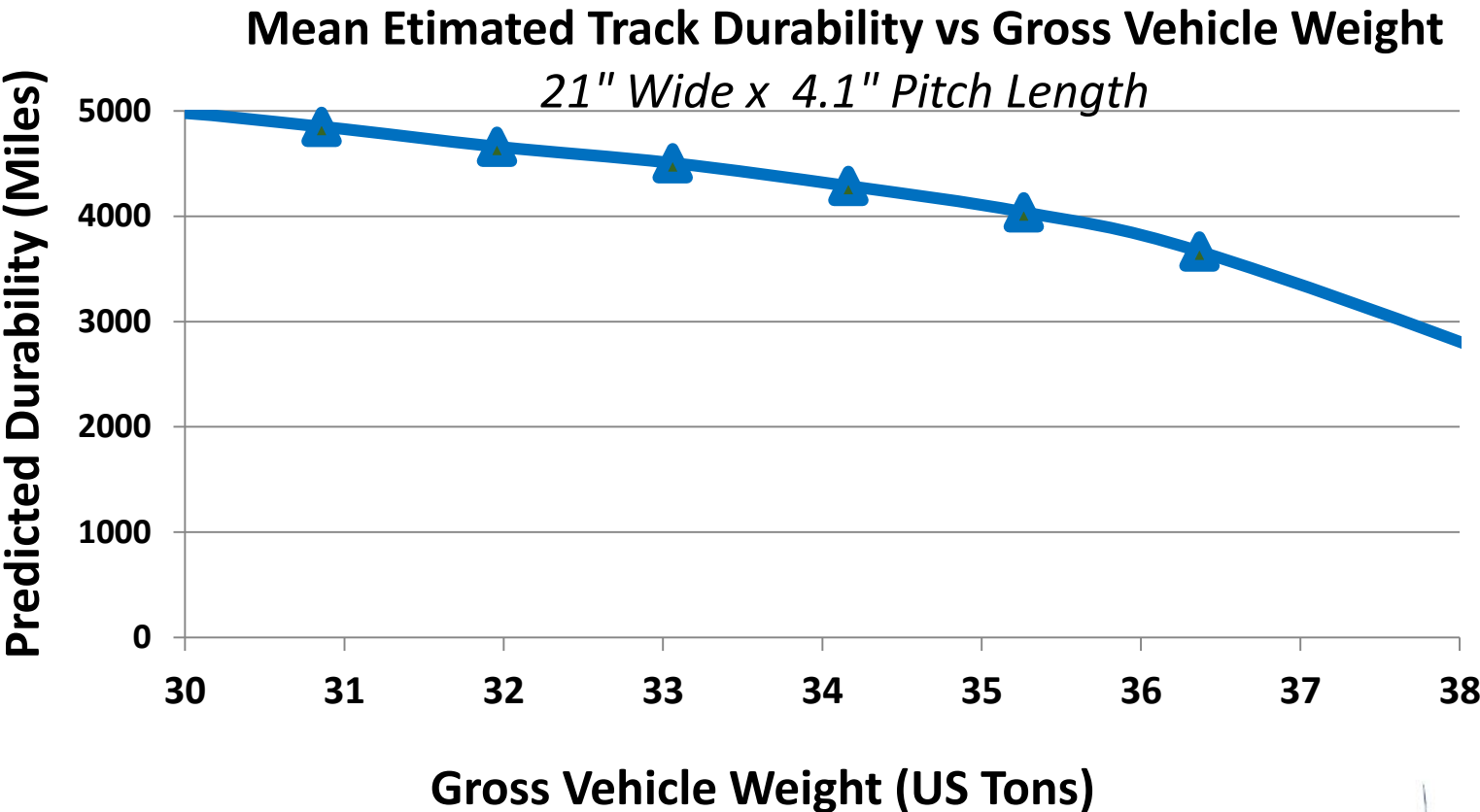
GROUND VEHICLE SYSTEMS ENGINEERING & TECHNOLOGY SYMPOSIUM
& ADVANCED PLANNING BRIEFING FOR INDUSTRY

NDIA
Michigan



DURABILITY

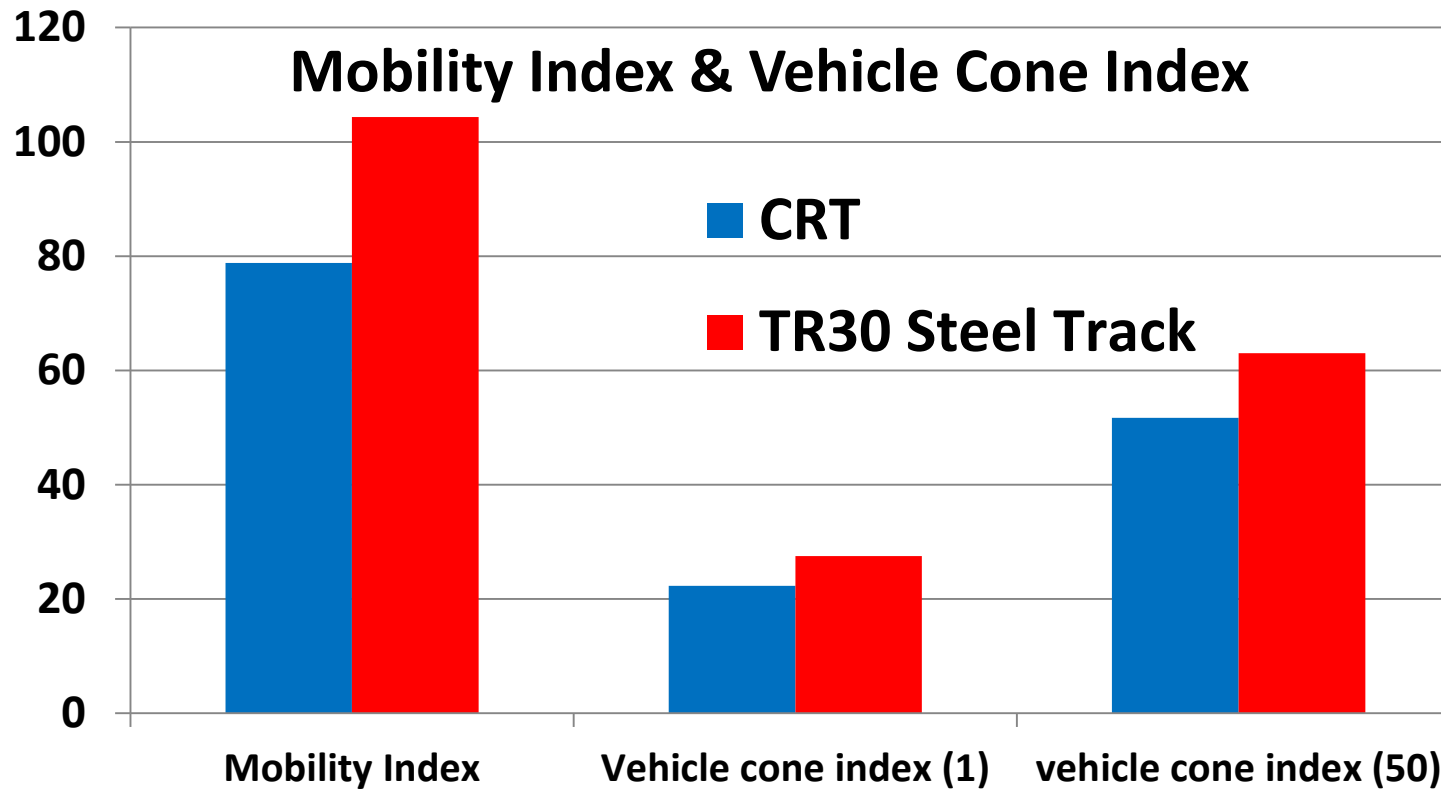






MOBILITY





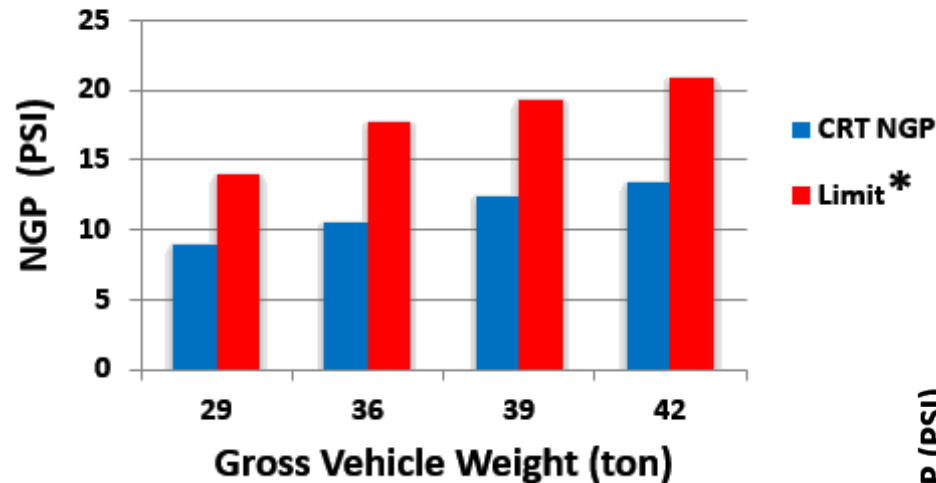
Mobility improved by 24 %

J.Y. Wong, Theory of Ground Vehicles

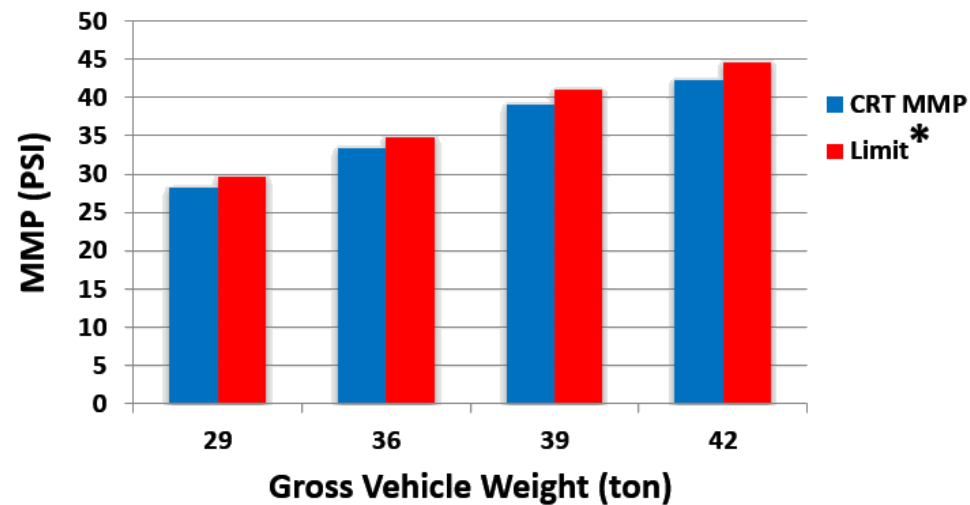




CRT Nominal Ground Pressure



CRT Mean Maximum Pressure



* Cardinal Point Specification for the Track System for the Warrior Family of Armored Vehicles.





MAINTENANCE





- CRT kit estimated mean **durability of ~4000 miles**:
 - Throughout the 3107 mile trial there have been **no CRT components changed** from the original parts fitted.
- The current Warrior estimated **steel tracks durability is 1000 miles**
 - 883 miles (ref. BATUS - British Army Training Unit Suffield, Canada)





- “Daily maintenance procedures only require a visual inspection on running gear components.”
- “The limited inspection **saved 415 man hours** for level 1 and 2 maintainers, over the 3107 miles performed.”



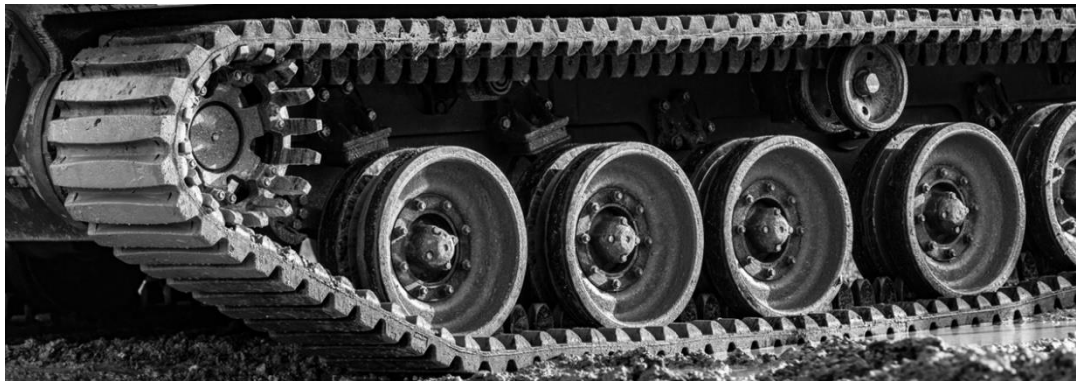


ATDU FEEDBACK





- *“When the Driver put in a steering demand at any speed the vehicle **responded immediately.**”*
- *“It was apparent that the **acceleration was much quicker** compared with steel tracks.”*
- *“The vehicle **stopped more sharply.**”*

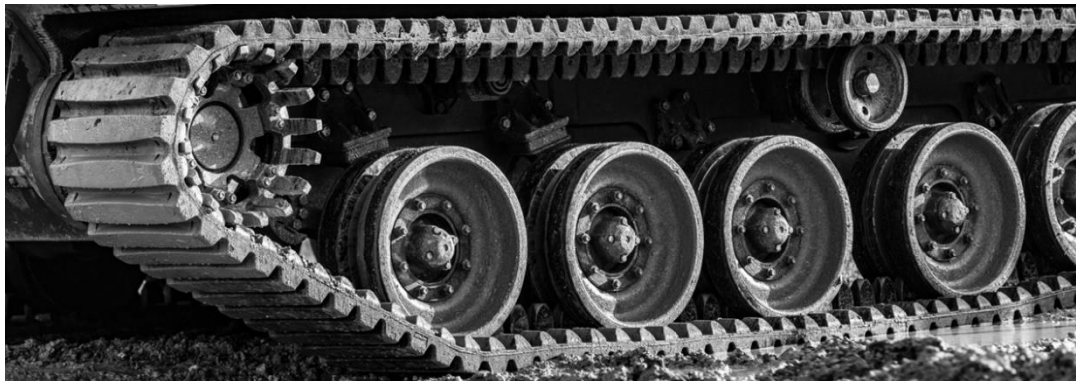


ATDU/040236 – COMPOSITE RUBBER TRACK TRIAL





- “There is a noticeable difference between the CRT and the steel tracks noting that there were **no physical feelings of vibration** and the **only noise heard is that of the engine** at all speeds over varying terrains.”*

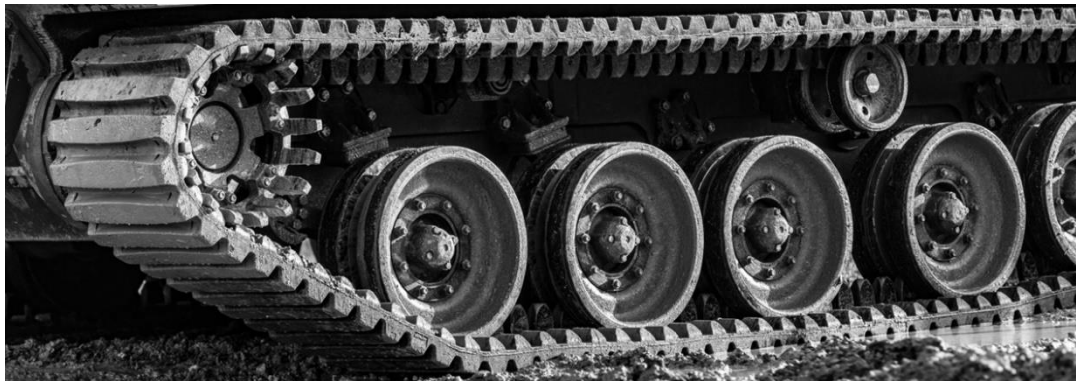


ATDU/040236 – COMPOSITE RUBBER TRACK TRIAL





- *“There is evidence that the **Noise and Vibration** produced by having **CRT** fitted is significantly reduced which will have a genuine effect on the health of our soldiers.”*

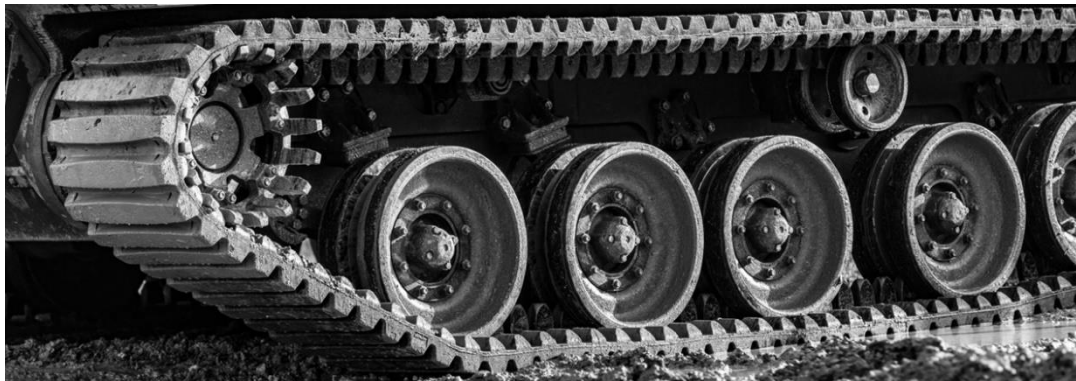


ATDU/040236 – COMPOSITE RUBBER TRACK TRIAL





- *“The CRT trial has been **extremely successful.**”*
- *“The trial achieved the aim of completing **3,107 miles** on one set of tracks.”*
- *“Having this track system deliver up to **5,000 miles** is realistic.”*

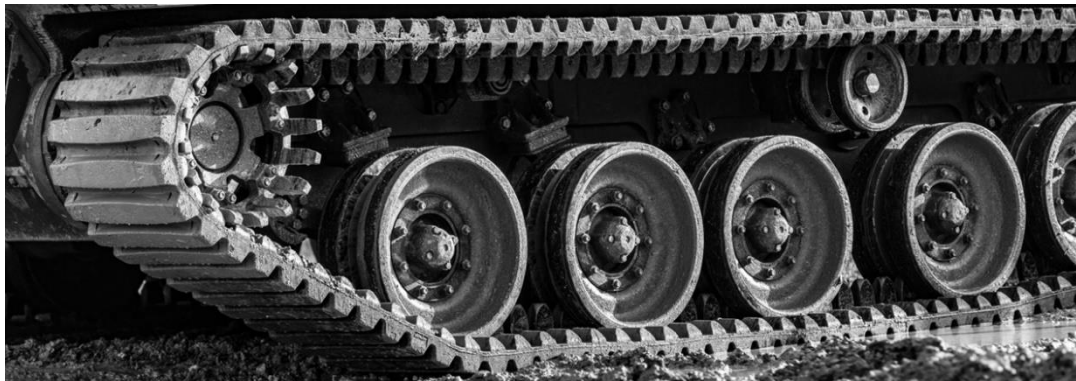


ATDU/040236 – COMPOSITE RUBBER TRACK TRIAL





- *“Confidence in the CRT technology has thus **grown significantly** and the trial has identified several possible exploitation opportunities in the current and future UK AFV fleet.”*



ATDU/040236 – COMPOSITE RUBBER TRACK TRIAL





**Thanks to the
ATDU Team**



