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NAC Aftermarket Brake Components Project

By: Leo Miller, USA National Automotive Center, and Carlos Agudelo, LINK Testing Laboratories, Inc.

"Full-and-Open Competition"

- Eliminate major brake component spare parts issues resulting from “sole source” and establish alternatives to traditional on-vehicle brake system component testing without conflicting with FMVSS to qualify alternate sources of supply.
WHY?
- Because we (US Army) “can”!
- Because we (DOD) have to “by law”!
- Because there’s nothing out there already which is readily usable.
- Because an industry-wide off-vehicle “fix” wasn’t in the foreseeable future.
"No manufacturer, distributor, dealer or motor vehicle repair business shall knowingly render inoperative, in whole or part, any device or element of design installed on or in a motor vehicle or item of motor vehicle equipment in compliance with an applicable FMVSS…“

(Federal Safety Act of 1966 (PL 95-599), Section 108, Paragraph 2[A])
“While on routine patrol……”

- Project initiated as a result of Congressional interest and supplier complaints (both from PA) of inability to qualify or bid on HMMWV-ECV model “sole-source” disk brake pads.

- Basically no US Federal requirements for aftermarket parts.

- No formal military processes to “qualify” alternatives and prohibitive costs to conduct on-vehicle vehicle testing.

- Army’s historical lack of in-house expertise.

- Fiscal constraints and political/managerial issues not unique to US Army, but major performance and logistical issues are.
Program Objectives by Army Stakeholders and Other Customers.

- “Fix the problem”; “get it done as quickly as possible”; and “don’t expand the scope!”

- Develop formalized methodology/processes to “fix” the sole-source problems on latest HMMWV disk brake pads – later expanded to all vehicle systems, “if practical and value-added!”

- Keep acceptability decision with assigned vehicle system engineer or designated equivalents only!

- Make sure both the Congressman and his constituent are happy, if possible!
- "Jennerstown testing" Meant that realistic TOP 2-2-608 inertia brake dynometer simulations approximating vehicle tests.

- "SAE approval" Meant to require participation and technical input by SDO’s and commercial truck marketplaces.

- "Aberdeen approval" Meant to require participation and technical input by military technical managers and testers, but "approval" not officially required of these orgs on secondary items.

- "HMMWV brake temps" Meant we must approximate highest Aberdeen Product Verification Testing (PVT) temps.

- "Affordability" Meant “affordability” for potential offerors without increasing risks to military users, programs, or budgets.
Enabling Technical Decisions.

- Vehicle system engineer (aka “ESA” in specs) retains full approval authority; keep acquisition, testers, and logisticians from making decisions for Army.

- To be useable, the ATPD/MIL-SPEC can’t be “pass-or-fail” document and must be “apples-to-apples” comparison between originally OEM and alternate offerings.

- “Mandatory” shall be minimum tests, testing and observations acceptable for a reasoned decision to accept or reject.

- GVW and similar won’t work for military due to all the different models and missions, so OEM “brake rating” and OEM hub hardware for fixturing used as much as possible.
- The inclusive term “ESA” (Engineering Support Activity) shall be defined as the responsible Army vehicle system engineering authority, equivalent non-Army Governmental vehicle design authority, or non-US Governmental civilian engineering activity’s designated vehicle or brake program engineer when used solely as a commercial/civilian undertaking. This definition may also include civilian commercial fleet owners or their designated surrogates when subject specification is used as a decision support tool for the specific brake replacement items covered by subject specification.

- DOD procurement offices/activities, other Government and quasi-Government procurement offices/activities, civilian/commercial buying offices/activities, and other similar non-engineering functions are specifically excluded from this definition as they do not have the vehicle system engineering expertise and/or legal approval authority required for brake systems and their subcomponents.
Enabling Decisions (continued).

- Offeror shall pay for “mandatory” testing; “optional” testing directed by and paid for by the Government!

- Testing activity shall be ISO 17025 registered or certified prior to start of testing!

- Offerors or suppliers can not qualify their products as a result of the ATPD/MIL-SPEC validation testing by the Government!

- Maximum use of existing civilian industry standards and procedures to increase acceptance and reduce program risk!

- Initial testing structure was based on ISO CD 15484 by LINK!
Challenges (New and Older Problems).

- HMMWV is our traditional “600-pound Gorilla”; all up-armored vehicles must be addressed.

- Common test processes must cover air and hydraulic across a broad spectrum, all presumed to be over 10K GCV.

- “Wet” brakes, odd or very low-density, and “E” brakes dropped or moved for now to reduce volume and complexity of ATPD-2354.

- The logistical and acquisition roles must be considered and common ground found between TACOM-Warren and DLA-Columbus NICPs (spares acquisitions).

- Who really has the power to say “yes” within the Government?
Some good, some bad, and..........

1. GOOD:
   a. Availability of historical Government brake test data ("Aberdeen").
   b. CRADA partners Link Testing Laboratories & TMC/ATA
   c. Support and funding has been based on significant cost savings, not the latest silver-bullet-fix technical fixes.

2. BAD:
   a. "Rice bowl" issues both inside and outside the Government.
   b. Lack of readily available SDO and/or commercial equivalent specs for off-vehicle/non-FMVSS performance, wear, crack/fatigue, etc.
   c. Nothing already in-place to fix/modify and most active vehicle stakeholders perceived as risk-adverse/reluctant to be first to adopt.
Create, Innovate, and Exploit to Achieve Goals!

1. Four Test Methods give “apples-to-apples” data to cover legacy vehicles, over-loads, commercial/non-tactical, and pure R&D.

2. Fixturing is defined and limited by Test Method to reduce complexity, costs, and duplications; alternatives provided.

3. TARDEC-managed “ATPD” allows early implementation by TACOM and DLA to fill time gap before DODISS approvals.

4. Proposed test methodology must be practical and sellable to all potential users: PEO/PMO, TACOM, DLA, other Services, etc.
### ATPD 2354 (MIL-SPEC) Mandatory Test Plan

**ITEM**

<table>
<thead>
<tr>
<th>TYPE OF TEST</th>
<th>TEST PLAN</th>
<th>PHYSICAL &amp; DIMENSIONAL PROPERTIES</th>
<th>INERTIA-DYNAMOMETER FRICTION BEHAVIOR and PERFORMANCE</th>
<th>INERTIA-DYNAMOMETER PERFORMANCE, WEAR, AND NOISE (TOP 2-2-608)</th>
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<td><strong>Standard/Test procedure</strong></td>
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**Total number of test samples submitted by axle sets**

12 & All 12

20 & 20
# NAC Aftermarket Brake Components Project

## What’s it look like?

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<th>ITEM</th>
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Total number of test samples submitted by axle sets 20 & 20
NAC Aftermarket Brake Components Project

What’s it look like?

Initial offeror presents part description and desired application

- Provide material sources, including Government depot
- Confirm applicable specifications, mandatory test plan, optional testing, and approved test facilities
- Provide vehicle and component information

Coordinate testing execution with an approved test laboratory

Review of test results

- Accepted as submitted (not based on similarity, similar use, or history)
- Conditional approval, requires additional testing
- Rejected with justification and rationale

OK to submit

- ESA approves use by purchasing activity
- ESA incorporates by Engineering Change Proposal (ECP)
- Repeat appropriate steps

- Incorporate item in Vehicle Logistical System
- Roll-up administrative and procurement activities (bidder’s list, schedules, etc.)

Key:
- Military activity
- Joint activity
- Vendor activity
What’s next?

1. Co-author SAE and TMC/ATA Draft Recommended Practices (RP) by LINK and TARDEC under existing agreements, 1CFY07.


3. Potential follow-on development of ISO/ECE and/or Federal requirements effort with commercial industry partners.

4. High-potential proposal by DLA-Columbus (DSCC) to expand project to cover “all” ground vehicle brake system spare parts.
Summary and Points of Contact.

“We took what was there, added some ISO, MIL-SPEC, and LINK stuff (with their permission) and created a workable and sellable output that will benefit the US Army and, by extension with appropriate changes, will form the basis for similar programs in the civilian sector.” (Leo, Jul ‘06)

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