PRACTICAL INTERPRETATION OF THE MSA BLUE BOOK

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1. INTRODUCTION

1.1 This paper and presentation focuses on the practicalities faced by an Environmental Scrutineer in performing duties in compliance with the MSA 'blue book' at smaller circuits and periodically used airfield venues and speed hills. It is brought to you by an individual who has a wealth of experience wearing a number of 'hats' although in no circumstances have they been conflicting or compromising.

1.2 I am an Environmental Health Officer who qualified in 1967 with subsequent qualifications in Noise Measurement & Management, Atmospheric Pollution, Environmental Impact Assessment and Development Control, and Road-side Noise and Emission Testing. I have practiced in London for over 40 years and for the past 20 in the field of Pollution Control. My current role is principal respondent to Major Development Applications in respect of environment issues, regulating major construction projects, and entertainment venues.

1.3 I have participated in motorsport as a competitor from the mid 1960's, as entrant and team manager in National & European Championships, and as an MSA official as Clerk Of Course, Environmental Scrutineer and Driving Standards Observer for past 20 years. I have also assisted with the Environmental Impact Assessment and Planning Application process for the expansion of a motorsport venue in the Home Counties.

2. PLANNING CONDITIONS AND RESTRICTIONS

2.1 A number of smaller circuits have operational hours imposed by Local Authorities which, although to the event organiser impact mainly on the completion of competition before curfew (i.e. Hethel 17.00 hrs, Lydden Hill 1800 hrs) has a tremendous impact at the beginning of the day for the Environmental Scrutineer . There are a number of circuits and periodic venues which prohibit running of engines before 0900 hrs on Saturday / Bank Holidays or 12.30 hrs on Sundays. Whilst this allows for pre-event scrutiny of car safety and protective clothing etc; and driver briefing, noise testing is prohibited.

2.2 The event programme always starts with practice sessions, which will invariably be 0900 hrs [12.30 hrs Sunday] for the first class and is generally followed by subsequent classes concurrently without intermission, based on a set number of laps, or a set time period. Competitors and their team management will be seeking to set their car up for optimum circuit conditions including tyre choice and pressure, and in race events will be seeking a qualifying time for grid position. All cars and drivers which proceed from the paddock / pit to form-up on the dummy grid will at this stage have already received a scrutineering pass sticker which is affixed to the car and checked by paddock exit official; however cars will not have been tested for noise !

2.3 The blue book clearly states and repeats in several regulations that all cars should be tested for noise before competition or practice for competition:

Section D Organisation
Organisers Rights
25.1.8. Check eligibility of any vehicle before, during, and after the competition …….
Scrutineering
33.3 An essential part of Pre-Event Scrutineering should be a sound test
7.8.1 Use meters or other means to check sound levels of all cars at scrutineering and during the event
7.9 Environmental Scrutineers have authority to refuse a start.

Section J Competitors : Vehicles
3.1 Scrutineering
Before taking part in any competition or practice for any competition all vehicles must be presented to event scrutineer for examination and approval
Silencing
5.17.1 …must be considered as part of eligibility to compete in events
Sound Test Requirements
5.18.9 Sound testing should be carried out BEFORE taking part in any competition

2.4 **Conclusion 1.** That the Environmental Scrutineer is placed in an inevitable position of having to waive all or most of the foregoing requirements, since there is inadequate time or the appropriate location / conditions for a measurement to be taken, recorded and immediate action taken on failures before practice commences .

2.5 Cold Engines. In support of competitors and their engineers I would support the view that race cars engines need to reach operational temperature before undertaking a high revving test; and that insufficient warm –up time may not present an accurate test.

3. LOCATION OF NOISE TEST AREA

3.1 The location of Noise Test area is crucial to accurate measurement, fairness of application, privacy and may facilitate better on circuit observations and assessments.

E Circuits & Venues
4.2.2 An area for noise test must be designated for all venues .

3.2 Although the Scrutineering bay would appear to be the place, it is required to be covered and allow for a minimum of 2 cars side by side. These will often have enclosed sides or portakabins alongside which do not create a free field for noise testing:- .

J Competitors & vehicles
Sound Test Requirements
5.18.1 Measurements should be made outdoors with no reflecting objects e.g. walls within 3.0 when using 0.5m test
5.18.2 Background levels should be at least 10dB(A) below measured level

3.3 In most circumstances the dummy grid formed of between 10-20 cars with engines running and revving to warm –up would not present conditions compliant with the above.

3.4 In practice noise tests at the smaller circuits and temporary venue are more appropriately conducted in an identified free field location which competition vehicles have to pass through on their return from the circuit to the paddock. Such a location enables the Environmental Scrutineer to check and record each vehicle, when the driver may be in a more relaxed and compliant mood having completed practice; although team management may be anxious to check tyre temperatures and settings.

3.5 At some tracks and events [i.e Lydden Hill] , testing at the specified location may cause a tail back and queue which interferes with circuit safety where a large class of cars has finished practiced., and the Environmental Scrutineer is required to waive through the tail of the field. NB 20 cars returning from circuit in formation = 10 mins approx testing.

3.6 **Conclusion 2** That the Environmental Scrutineer is not able to meet the requirement for testing all cars.

3.7 The noise test location may, by its proximity to the circuit facilitate the opportunity for the Environmental Scrutineer to observe and monitor with the use of a tripod mounted sound level meter or otherwise, those vehicles appearing to be making more noise than others in the field which would then allow for selective testing of a percentage of cars in each class. A random selection process could also be applied.

4. TESTING PROCEDURE – MAX REV & dBA ANOMOLIES

4.1 The foundation for the maximum noise limits set out in ***J Appendix 1 Chart 5.18*** [See Appendix 1] is based on maximum r.p.m where ¾ or $^{2}/_{3}$ is set out for different disciplines of motor sport. This has allowed for a pattern of acceleration and deceleration and whether cars are in close succession [racing] or singularly [sprinting] However there is no technical requirement for vehicles to be equipped with a rev counter.

4.2 Certain championships and sporting disciplines allow for self build cars or those with such modifications which create a confusion as to which 'definition' they belong. This could be either Saloon/Sports @ 105dB or Sports Racing @ 108dB [i.e Silhouettes, Intermarque etc.[See Appendix 11]

4.2 **Conclusions 3.** That the Environmental Scrutineer is faced with verifying the judgement made by the competitor,

a) as to which category their car fits and
b) that they are revving their cars to the maximum level required whilst the Environmental Scutineer is performing the test at the rear or side of the vehicle.

Even with the aid of an assistant this is far from an accurate process

4.3 Some drivers are unable to hold engines on a steady rev limit due to electronic engine management systems not being set-up for off-load static revving, or the cars present an artificially low noise level under static testing, as opposed to under-load during competition due to software programmes, anti-lag or turbo boost pressure. These situations are covered by the regulations, which could constitute a failure, and subsequently a refused start; however 'during event monitoring' and re-call is the more favourable option.

4.4 It is appropriate to mention here that certain categories of motor sport are not governed by mandatory silencing:

J. Competitors & vehicles - Silencing
5.17.2 All competing vehicles are subject to mandatory silencing unless specific waiver for that class or formula
5.17.5 F3 British GT & British Touring Cars 118dB(a) max

However when such vehicles are entered in specific events i.e National A Hillclimb or Sprint they must conform to both Chart 5.18 and venue specific noise restrictions

4.5 Planning Restrictions and Circuit restrictions may impose additional noise restrictions on the competitor.

J Competitors & vehicles – Silencing
5.17.8 Circuits / venues may impose additional restrictions

Some circuits reduce maximum noise level to 105dBA or even 100dBA. This may be due to specific planning or environmental restrictions or part of a quota of meetings. Where these circuits hold a championship event within a series touring the UK venues, competitors will be required to make the necessary additional silencing or to decide not compete at that venue. Environmental Scrutineers must ensure that additional silencing is permanent for the duration of the event.

5.17.7Temporary silencers, bypass or temporary parts are prohibited

Certain championship series no longer include venues with restricted sound levels in their series i.e MSA Rallycross – Knutts Corner – Belfast [100dBA], Bentwaters Airfield restricted to max 98dB [road rally only] lost to Sprinting discipline from January 2010.

4.6 MSA : FIA

J. Competitors & vehicles - Silencing
5.17.1 FIA approved championships rounds held in UK are exempt from MSA sound tests requirements [eds Note however they have their own criteria]

4.7 Example – European Rallycross Contradiction in rules

MSA : All categories ¾ max revs Max level 108dBA fast
FIA: All categories 4500 revs Max level 100dBA slow + Matted testing area

5 TESTING PROCEDURE – EXHAUST OUTLET ANOMALIES

5.1 Environmental Scrutineers should be present at the event in sufficient time to attend scrutineer bay and /or the competitors pit to inform themselves where certain category cars exhausts terminate. This will be of considerable benefit when under pressure at noise test area.

J. Competitors & vehicles – Sound Test requirements.
5.17.6 Measurements will be made at 0.5 from <u>end</u> of exhaust pipe with microphone at an angle of 45^{o} with the <u>exhaust outlet</u> and at a height of <u>0.5 to 1m above the ground</u>
5.17.7 Where more than one exhaust outlet .. test will be repeated for each and the highest reading used

- Exhausts
5.16.2 No part of exhaust system to protrude from <u>rear</u> bodywork by more than 15cms [6 in]
5.16.4 rear engined single-seater racing cars exhaust between 4cm and 60cm above the ground
5.16.5 exhaust outlets terminating behind the mid-point of the wheelbase to be within 150mm [6 in] of the outside of the bodywork or not to protrude more than 4cms

5.2 In the majority of classes and formula it is reasonably practical to undertake 0.5 metre within a 20-30 sec period including where there 2 exhaust outlets from V configured engines on either side of the vehicle.

5.3 Some vehicles are fitted with a wide fan shape outlet at rear or side incorporated into the bodywork which makes it difficult to judge the 45^{o} outlet. I have observed single seater racing cars where exhaust outlets higher than the prescribed 60cms.

5.4 More recently I have been presented with exhaust outlet terminating mid way under the car floor pan [Inter-marque -National Hot Rods Saloons – racing under MSA rules]. Even if stretching under the car from the rear to perform a test, the result would be influenced by reflection off the road surface and body-pan.

5.5 Other technical issues
There are some cars [i.e Nissan Skylines and Ford RS200] which have both exhaust and turbo outlets, where the turbo boost pressure can be adjusted, resulting in reduced noise levels being recorded.

> ***J. Competitors & vehicles – Sound Test requirements.***
> *5.18.2 Where outlet is not immediately accessible the test may be conducted at 2.0 m from centre line @ 90^{o} of vehicle at height of 1.2 m above the ground.*

5.6 **Conclusion 4** Although this is allowed for in the rules, it is not practical for the Environmental Scutineer to set up a separate testing regime when subject to intensely busy testing periods, with the further requirement to be equipped with additional meters and accessories.

6. DEALING WITH NON-COMPLIANCE AT THE MEETING

6.1 Having tested cars in the designated area and recorded levels, there will be failures. Environmental Scrutineers will use their judgment to allow a tolerance of 1 or 2 dBA over. These competitors must be immediately informed [and followed –up see below] but advised that they are permitted to start competition.

6.2 It is not practical for excessive failures to be held in the noise testing area. In such circumstances the competitor must be sent away in full knowledge that their car cannot take part as presented. Environmental Scrutineer must maintain close liaison with The Chief Scrutineer - via radio/ mobile link as the vehicle already carries a scrutineer's pass sticker. The Chief Scrutineer should request the offending vehicle to be brought to scrutineering bay for removal of the scrutineering pass sticker. It must be remembered that heats or races are likely to be starting imminently leaving the competitor with little or no time for rectification, in the circumstances a re-test is most likely to be the initial request. The driver and the team will be 'anxious' and seeking swift attention from the Environmental Scrutineer.

6.3 **Conclusion 5** Environmental Scrutineers are faced with concurrent and conflicting demands for their service. They cannot leave their testing location whilst the next practice class is due to leave the circuit, and also attend to re-test failures elsewhere simultaneously. .

6.4 The Environmental Scrutineers should make themselves available at the first opportunity after all practice has been completed; either at the testing area or a suitable location, to deal with failures preferably in an order of priority based on their timetabled heat or race. A second test should be offered with great attention to max revs, possibly with a second meter alongside.

6.5 Competitors may offer to repack or add additional silencing; this must be of a permanent nature and fitment should be observed in progress either by the Environmental Scrutineer, or a technical scrutineer. A further test must be undertaken and passed within tolerance before the car is re-issued with a scrutiny pass sticker and allowed to compete. Failing the test will lead the Environmental Scutineer to recommend to exclusion

> ***D Organisation***
> *7.9 ES have authority to refuse start*
> *7.9.5 No protest or appeal can be made against decision of ES,*
>
> *10.2.2 ES are Judge of Fact in respect of sound*

7. FOLLOW THROUGH ON FAILURES – AFTER THE EVENT

7.1 Any vehicle failing test + tolerance must be issued with Notice which states the levels obtained and time date etc.. Copies of which are handed to Clerk of Course and Chief Scrutineer. It is here where the process breaks-down. The responsibility rests with the competitors and their team to ensure works are undertaken to a level of compliance. Only certain categories of Motor sport require the competition car to have a racing log book.

> ***J. Competitors : Vehicles***
> *2.1 Competition Car Log Books are required for certain sporting disciplines*

7.2 **Conclusion 6** Without this being universally applied, there is no process whereby failure notifications and details can be recorded in order that at the next event /venue different scrutineers will be able to follow –up on compliance with work requirements.

8 NOISE EQUIPMENT PROBLEMS

8.1 It is paramount that the Environmental Scrutineer tests have been undertaken with a currently calibrated meter on full batteries since failure may lead to a recommendation for refusal to start for which there is no right of protect or appeal.

8.2 Weather – Anticipate that 50% of scrutineering duties will be undertaken during rainfall in an open area and at airfields which are subject to unusually high winds. Meters can and must be protected for meteorological conditions. However – winter series i.e Rallycross & Stage Rallies often have start times where temperature is well below zero. I believe certain meters should not be used to provide accurate reading.

8.3 Certain categories of cars have rev-limiters which create excessive loud back-fire. Meters can go into over-load mode and may not recover for several minutes.

8.4 Microphone–clogging by exhaust particles can result in inaccurate readings

9 SUGGESTIONS TO IMPROVE INGREGRITY OF NOISE TESTS

9.1 MSA could make installation of a rev-counter a mandatory requirement.

9.2 MSA could more specifically define saloon, silhouette, sports libre and space-framed cars.

9.3 MSA could require all disciplines of motor sport to hold competition car log book where notices and penalties can be entered, with a more robust process for discharging / compliance with works conditions

9.4 Organisers of events restricted by Planning condition start times should programme a window of opportunity for Environmental Scrutineers to undertake noise tests on all cars before practice.

9.5 Organisers should budget for an additional Environmental Scrutineer to aid the process and follow-up failures more expeditiously.

9.6 Technical Scrutineers should be more vigilant on the location of exhaust termination and not pass cars failing to meet rules.

9.7 The issue of static testing cars with Turbo boost / Turbo lag and ECU management should be further debated.

APPENDIX 1

'Blue Book' Section J Competitors :Vehicles

Chart 5.18: Maximum Noise Levels in dB(A)

Section	0.5m	2.0m	
A	105	93	**Car Race (Saloon & Sports Cars) Max @ ¾ Max RPM**
B	108	96	**Car Race (Single Seater & Sports Racing Cars) Max @ ¾ Max RPM**
C	100	88	**Stage Rally, Autotest, Trials, CCV Max @ 4.500 RPM**
D	98	86	**Road Rally Max @ $^2/_3$ Max RPM**
E	100	88	**CCV Max @ $^2/_3$ Max RPM**
F	108	96	**Autocross & Rallycross Max @ ¾ Max RPM**
G	110 108	98 96	**Hillclimb& Sprint Max @ $^2/_3$ Max RPM** **Racing & Sports Libre Cars & Cars Complying with 1.82 & 1.103** **All Other Categories**

APPENDIX 11

'Blue Book' Section B Definitions

Silhouette
Outline of the original body shape in side and plan view of the vehicle above a line drawn through front and rear hubs

Sports Car
Car having either a non-detachable or detachable roof with no more than 1 door on each side and a minimum of 2 seats situated one on each side of the longitudinal centreline. Minimum of 100cars constructed in a consecutive 12 month period.

Sports Racing car
A two seater open or closed racing car built for sole purpose of taking part in races on closed circuits. Closed cars must have a windscreen and 2 doors 1 on each side of the cockpit.

Touring car
Series Production Cars of which 2500 identical examples are or have been manufactured within 12 month consecutive period and which is equipped with minimum of 4 adult seats, integral non detachable roof; minimum of 2 doors one each side of vehicle and minimum dimensions defined

Saloon car
Is not separately defined

Sports Libre
Is not separately defined

REFERENCES

All references in italics and Appendices are made to specific regulations in the:
Motor Sports Association United Kingdom – Competitors and Officials Yearbook 2010 54th Edition