

Validation of the methodological choices

The SOURCE method was validated on the basis of two analysis criteria:

- The ability to produce **reliable, reproducible measurements**, particularly for measuring the common speed, in compliance with the initial specifications (cost, output, equipment level).
- **The relevance of the choice of common speed to reflect the road condition** on this scale in the range of road networks under study.

Validation of the measuring method

This work was performed by combining the use of a powerful, specially-designed tool of computer simulation together with the field test measurement campaign.

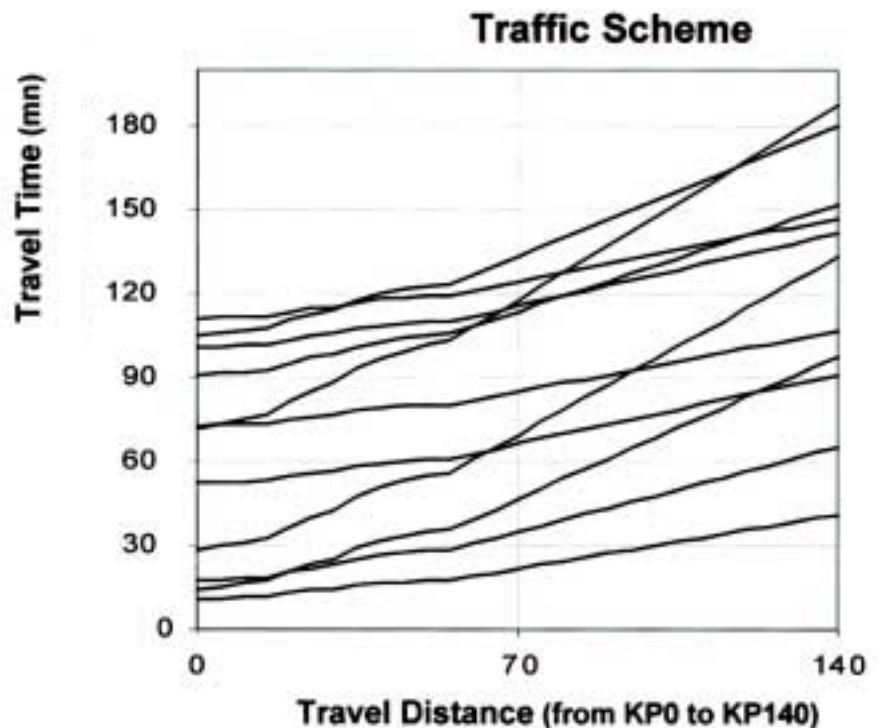


Fig.6. Graphic representation of traffic.
Each line represents the path of a vehicle travelling on the road. The more the line tends towards the horizontal, the faster the vehicle. Where two paths cross on the graph, one vehicle is overtaking another. Traffic is only represented here in a single way

of travel. The oncoming traffic would give a second series of paths rising from right to left, not from left to right. In fact, part of the real traffic does not travel the road over its entire length: junctions, branching off, stops or starts. Paths that begin and end along the way are therefore to be added.

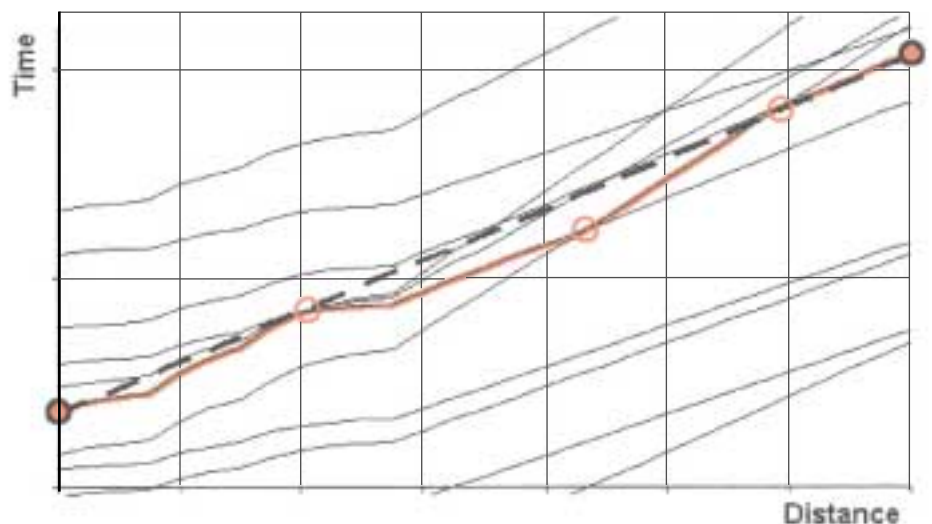


Fig.7. Integration of floating vehicle (FV).
Here the FV (red path), "floating" in the traffic flow, has changed followed vehicle 3 times. The slope of its path (black dotted line) corresponds to its own mean speed over the trip path. For sufficient (or correctly matched) distances

and traffic levels, this physically achieves **very good statistical integration of the mean speed** of traffic (i.e. the harmonic mean of the vehicle travel speeds) in a much broader vicinity than just that of the sample of followed vehicles.

Roads in developing countries, management and monitoring

To measure common speeds, 6 measurement protocols were studied and tested: that of the "floating vehicle" and 5 "window" protocols. All these window protocols were based on: traffic "capture" within a closed area containing fixed and moving observers, then the reconstitution of the mean speed through the differentials between real traffic (perceived by the fixed observers) and apparent traffic (perceived by the moving observers). These 6 protocols are symbolized by the opposite icons, which in each case present in diagram form the observation system integrated in the traffic flow.

All these protocols have been tested by computer simulation and field tests.

The floating protocol proved to be the most efficient by far in terms of quality of measurements. Again its tolerance ceiling and flexibility to traffic disturbances are the highest. Furthermore it is the most economic (in terms of productivity and resource mobilization). A second series of computer simulations, more accurately parameterized on the basis of ranges and distributions recorded in the field, enabled still further fine-tuning of this protocol. After finalizing this protocol it was therefore used for the first full SOURCE measurement campaign developed on a large scale in Ghana.

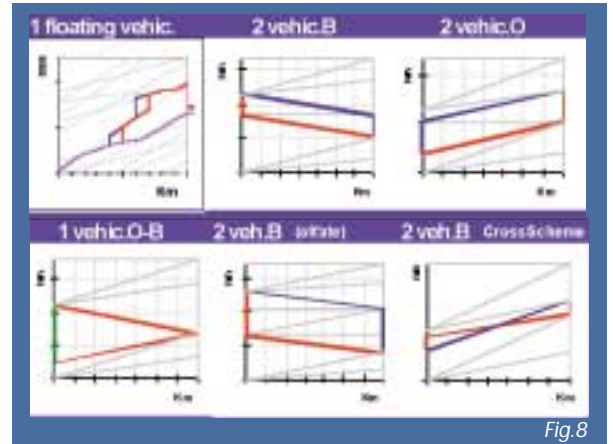


Fig.8

This experimental measurement campaign notably enabled testing of the field instruction manual, data input and processing tools.

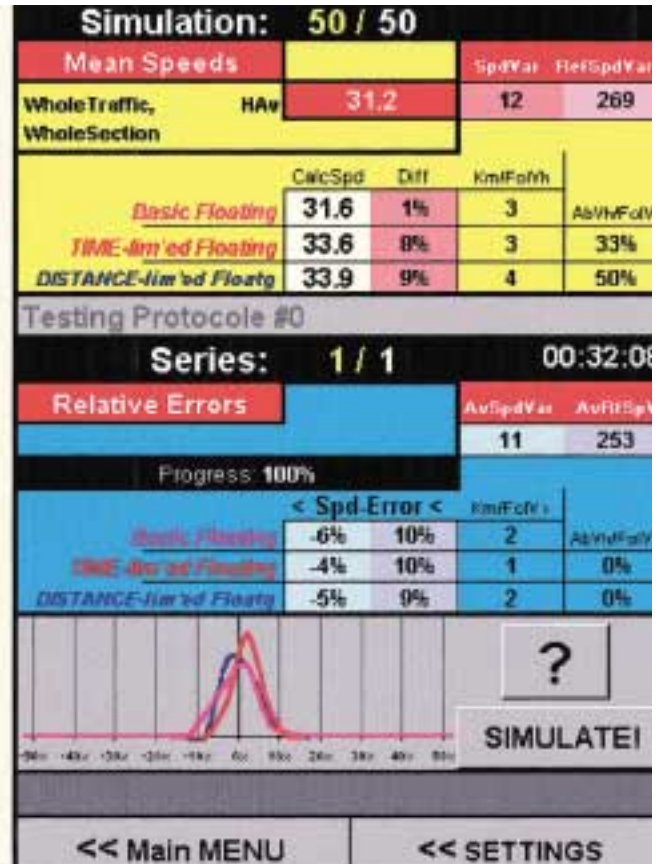
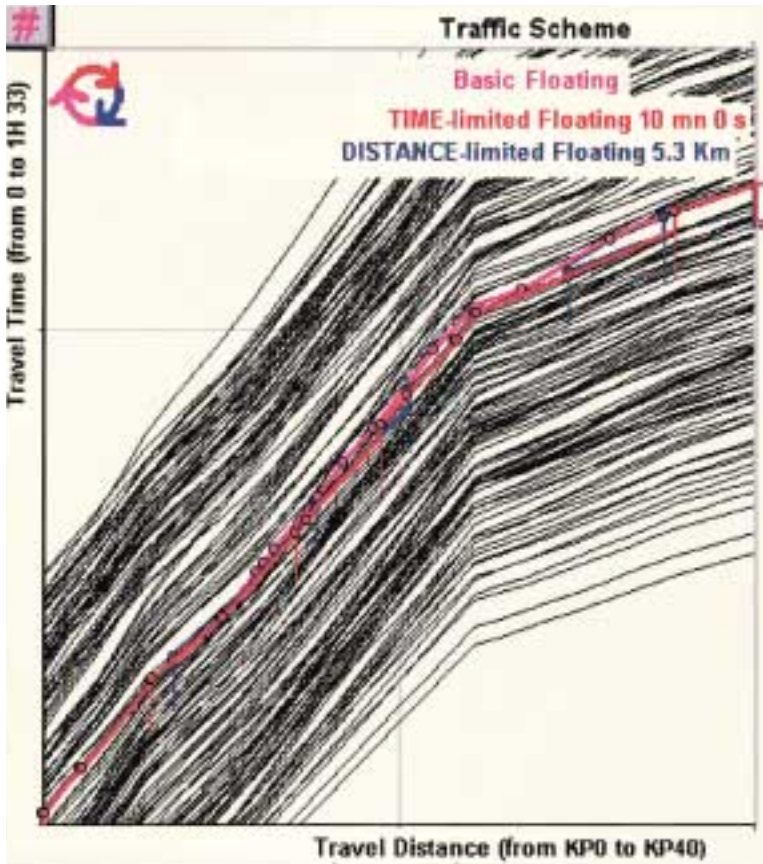


Fig.9. Display of a series of computer simulations of the micro-adjustment of the floating operation protocol.

Validation of the choice of LV speed as a guideline parameter: speed-roughness correlations

This very conclusive work was conducted during the first test measurement campaign using conventional

heavy, exhaustive methods (roughness measurement by bump integrator, visual multicriteria recordings) in conjunction with the speed measurements, in order to subsequently work on the correlations.

However, it is important to be aware of the limits of this work. The generalization of IRI for measuring surface roughness was the fruit of an

extensive standardization quest, but it is not the perfect comprehensive index of road condition (which is why many competitive multicriteria methods, all fairly similar, are available). The SOURCE approach, on the other hand, gives special weight to the actual level of service of the road, more than its condition. The extent of surface deformation (roughness) is but one (major) component.

