

CRASH

ETSC's Newsletter on European Vehicle Crash Protection

FEBRUARY 2001

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SPECIAL EDITION

SAFER CAR FRONTS FOR PEDESTRIANS AND CYCLISTS

Safer car fronts for pedestrians

- The European Commission has given the car industry until June 2001 to negotiate a voluntary agreement. This is as an alternative to a mandatory type approval rule promised by the Commission most recently in March 2000 as one of six cost-effective road safety priorities for the short term. If the voluntary proposal is unsatisfactory then the Commission promises legislation.
- The European Parliament has put the adoption of the four EEVC tests in legislation at the top of its priority list (January 2001). The Council of Ministers urged early legislation in its road safety resolution last June.
- ETSC believes that legislation adopting the 4 tests is, by far, the most important transport safety action currently on the agenda and could reduce the risk of death and disabling injury for thousands of citizens in road crashes every year.
- MEPs and ETSC believe that the voluntary agreement proposed by industry will halve the feasible cost-effective protection which the 4 tests proposed for legislation could deliver. EU action needs to ensure that the 4 tests are adopted without being weakened and without any further delay.
- ETSC wants the Commission to publish draft legislation with the 4 tests immediately to communicate clearly how far industry needs to move beyond its current voluntary offer if it is to provide a high level of protection.
- This further delay misses the opportunity to save up to 1000 lives.

UPDATE

In their last meeting before Christmas, the European Commission agreed that the car industry should be given another 6 months, until June 2001, to negotiate a voluntary agreement, otherwise they would bring forward a legislative proposal.

Earlier in December, Vice President de Palacio indicated her support for a legislative proposal to the European Parliament's Transport Committee, which viewed legislation on safer car fronts as the top EU road safety priority.

ETSC had urged the Commission to go straight to legislation since negotiations on a voluntary agreement over the last 12 months had led to unsatisfactory proposal as regards the level of protection on offer and a five year lead time. There is a strong mandate for legislation not only from the European Parliament but also from the Council of Ministers and further discussion over the next 6 months is a missed opportunity to save up to 1000 lives.

A hearing is now scheduled for 6th February jointly hosted by the Enterprise and Transport Commissioners to consult with all interested parties.

ETSC sets out, in the following sections, the long background to this important road safety issue – the history of the research and development, the cost benefit studies, the estimates of casualty reduction, the EuroNCAP pedestrian test results and ETSC's assessment of the proposals for a voluntary negotiated agreement.

WHY DO WE NEED SAFER CAR FRONTS?

In 1998, over 8,900 pedestrians and cyclists died on EU roads and over 180,000 were seriously injured. Most were hit by the fronts of

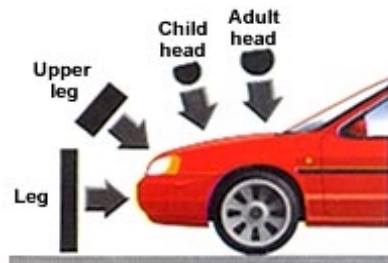
cars in urban and residential areas and the majority of these were children and elderly road users. Most of these impacts occurred at crash speeds of up to 40km/h. Nearly all fatal and serious injuries sustained were received from contact with the car.

All car users are also pedestrians and several Member States are now actively encouraging people to leave their cars behind for short trips and use their bicycles, walk or take the bus. Pedestrians are roughly eight times more at risk of fatal injury than car passenger.

ETSC believes that a range of actions are needed to reduce pedestrian and cyclists injuries. The most important EU action, however, is to bring about improvements in vehicle safety design which could make a substantial contribution to casualty reduction.

THE 4 EEVC TESTS PROPOSED FOR LEGISLATION

Devising four interdependent car crash tests leading to better protection for vulnerable road users has been the focus of a 22 year EU-funded research and development programme, involving national transport laboratories, government departments and industry, brought together by the European Enhanced Vehicle - safety Committee (EEVC).



The tests are an integrated package and each simulates impacts to the parts of the body which most frequently sustain severe injuries in car to pedestrian impacts – the head (both adult and child), the pelvis and upper leg and the lower leg.

ETSC estimates on the basis of studies carried out under the EU programme that around 2,000 lives and 18,000 serious injuries could be prevented annually if all cars on EU roads today met these tests (See below).

The UK Government's road safety strategy (March 2000) notes that a legislative proposal incorporating these four tests could reduce

serious and fatal pedestrian injuries nationally by 20 per cent.

The tests have provided the basis for the recent priority setting on road safety of all the EU institutions. They have been ready since the early 1990s and have been used since 1996 by the European New Car Assessment Programme (EuroNCAP) which provides information to consumers on the crash performance of cars and which receives substantial Commission funding. While the European car industry has responded to the car occupant tests in EuroNCAP, which are covered by EU legislation, new cars tested to date have performed badly in the pedestrian tests (See below for test results).

ESTIMATES OF CASUALTY SAVINGS FROM ADOPTION OF 4 EEVC TESTS

ETSC has carried out two assessments based on studies carried out during the EU research and development programme on safer car fronts. Both use casualty totals for the EU from the International Road Traffic Accident Database - IRTAD (1998 data), ratios of fatal to serious injury based on several EU countries and estimates of under-reporting of serious pedestrian and pedal cyclist casualties in vehicle accidents.

Estimate 1 uses TRL estimates of pedestrian casualty reduction benefit (8% saving in deaths and 21% saving in serious injuries) and SWOV estimates of pedal cyclist casualty reduction benefit (3.5% of deaths and 8% of serious injuries).

Estimate 2 uses the MIRA estimate for pedestrian casualty reduction benefit (30% saving in deaths and 17% saving in serious injuries) and the SWOV estimates of pedal cyclist casualty reduction benefit (3.5% of deaths and 8% of serious injuries).

ESTIMATES OF NUMBERS OF CASUALTIES THAT COULD BE SAVED ANNUALLY IN THE EU		
	ESTIMATE 1	ESTIMATE 2
	Fatal Serious	Fatal Serious
Pedestrians	530 18773	1985 13641
Cyclists	80 4461	80 4461
TOTAL	610 23234	2065 18109

NB:1998 EU total includes 1994 data (Greece) and 1996 data for pedestrian and p/c casualties for Luxembourg and Portugal

EU PEDESTRIAN AND CYCLIST DEATHS 1998 AND ESTIMATED NATIONAL SAVINGS FROM ADOPTION OF EEVC TESTS (Using Estimate1)

	Pedestrian & cyclist deaths	Deaths as % of EU total	Lives saved
GERMANY	1721	19%	347
FRANCE	1362	15.5%	324
ITALY	1211	14%	267
UK	1111	12.5%	290
SPAIN	1109	12.5%	302
PORTUGAL+	548	6%	142
GREECE*	495	5.5%	141
NETHERLANDS	313	3.5%	42
BELGIUM	297	3.5%	53
AUSTRIA	222	2.5%	51
DENMARK	131	1.5%	24
IRELAND	135	1.5%	35
SWEDEN	127	1.5%	23
FINLAND	116	1%	21
LUXEMBOURG+	9	0.1%	3
EU TOTAL	8907	100.1%	2065

*1994 data
+1996 data

- If all cars on the road today passed the four tests then over 2000 deaths and around 18000 serious injuries could be prevented.
- Over 20% of all EU pedestrian and cyclist deaths could be prevented if all cars passed the 4 pedestrian tests.
- 172 lives lost monthly could be saved and 1500 severe injuries prevented.

PEDESTRIAN COST-BENEFITS FROM STUDIES

YEAR	ORGANISATION	COST/BENEFIT
1992	European Car Manufacturers Association (ACEA)	57 : 1
1993	ACEA	53 : 1
1993	Transport Research Laboratory (national research organisation, UK)	1 : 7.5
1994	ACEA	52 : 1
1995	ACEA	321:1 or 423:1
1997	Transport Research Laboratory, UK	1: 7.1
1997	Motor Industry Research Association, UK	5.3: 1 (lowest estimate)
1998	Motor Industry Research Association, UK (revised earlier estimate)	1.7 : 1 (lowest estimate)

Note: Different studies use different assumptions e.g. whether new designs of cars or all new cars. In addition a Dutch national cost benefit study carried out in 1994 by the Dutch Institute for Road Safety Research concluded that the benefits exceeded the costs.

EUROPEAN NEW CAR ASSESSMENT PROGRAMME (EuroNCAP) EEVC PEDESTRIAN TESTS RESULTS

Summary:

- The four EEVC tests performed since 1996 on the following new cars show that all failed and performed poorly.
- The maximum rating is **** (4 stars) which would be needed to pass legislative tests.
- Only one car has received 3 stars but would still have failed the EEVC requirements overall.
- The industry has not yet provided pedestrian protection on a voluntary basis.

EURONCAP PEDESTRIAN STAR RATINGS FOR VEHICLE MODELS TESTED TO DATE

MAKE	MODEL	RATING Max rating =****
PHASE I		
Fiat	Punto	*
Ford	Fiesta	*
Nissan	Micra	**
Renault	Clio	*
Rover	100	**
Vauxhall/Opel	Corsa	*
VW	Polo	*
PHASE II		
Audi	A4	**
BMW	3 Series	**
Citroen	Xantia	*
Ford	Mondeo	**
Mercedes	C-Class	**
Nissan	Primera	**
Peugeot	406	**
Renault	Laguna	**
Rover	600	**
Saab	900	**
Vauxhall/Opel	Vectra	**
VW	Passat	**
Volvo	S40	**
PHASE III		
Audi	A3	**
Citroen	Xsara	**
Daewoo	Lanos	**
Fiat	Brava	**
Honda	Civic	**
Hyundai	Accent	**
Mitsubishi	Lancer	**
Peugeot	306	*
Renault	Megane	*
Suzuki	Baleno	**
Toyota	Corolla	**
VW	Golf	**
Toyota	Avensis	**
PHASE IV		

Audi	A6	**
BMW	5 Series	*
Mercedes	E-Class	**
Saab	9.5	**
Toyota	Camry	**
Vauxhall/Opel	Omega	**
Volvo	S70	**
PHASE V		
Ford	Focus	**
Ford	Escort	**
Nissan	Almera	*
Vauxhall/Opel	Astra	*
PHASE VI		
VW	Sharan	**
Mitsubishi	Space Wagon	**
Vauxhall	Sintra	*
Chrysler	Voyager	*
Renault	Espace	**
Toyota	Picnic	**
Peugeot	806	*
Nissan	Serena	**
PHASE VII		
Fiat	Punto	**
VW	Lupo	**
MCC	Smart	**
Hyundai	Atoz	**
Vauxhall	Corsa	**
Honda	Logo	**
Lancia	Ypsilon	**
VW	Beetle	**
Honda	Accord 1.81 LS	**
Saab	9.3	*
Volvo	S80	**
Mercedes	E Class	**
Saab	9.5	**
Volvo	S70	**
Peugeot	206	**
Renault	Clio	**
Skoda	Fabia	**
Toyota	Yaris	**
VW	Polo	**
Daewoo	Matiz	**
Daihatsu	Sirion	***
Ford	Fiesta	*
Ford	Ka	*
Seat	Ibiza	**
Citroen	Saxo	**
Fiat	Seicento	**
Nissan	Micra	**

WHAT CHANGES ARE NEEDED TO MAKE CARS MORE PEDESTRIAN FRIENDLY

The human frame can withstand astonishingly high forces without serious injury. Therefore, pedestrian protection features built into cars can be very effective in preventing serious and fatal injuries in accidents at moderate speeds. Most of the serious injury pedestrian accidents and many fatal accidents occur at impacts up to about 40 km/h which covers about 70% of serious injury pedestrian accidents and about 18% of fatal accidents with the fronts of cars. Because of the high forces that pedestrians can withstand only a relatively small change is required from current car strengths, but larger crush depths between the car skin and underlying immovable parts are needed.

1. IMPROVEMENTS TO THE BUMPER

The bumper is normally the first part of the car that makes contact with a pedestrian in a crash. Pedestrians are normally hit in the side when crossing the road. The impact will often break the leg or smash the knee joint by bending it sideways.

Currently most car bumpers are made of plastic but immediately behind the bumper there is often a heavy cross member to provide vehicle and occupant protection.

For pedestrians the immovable parts behind the bumper need to be moved back or the bumper needs moving forward so that the front face of the bumper will be able to crush about 5 to 7.5cms in an impact with a pedestrian's leg.

2. IMPROVEMENTS TO THE BONNET LEADING EDGE

In pedestrian accidents the bumper contact starts to sweep the pedestrian's legs from under him. Next contact is normally between the upper leg and/or the pelvis and the bonnet leading edge. Currently most cars, particularly the taller ones are too rigid in this area.

Detailed changes to the sheet metal bodywork of the bonnet edge are required to reduce stiffness and provide sufficient crush depth. This can be done by weakening or moving back the under-bonnet reinforcement, the lock and lock cross-member to allow the outer skin to deform. The actual crush depth and modifications required to make a car safe are very dependent on the vehicle's shape. Streamlined cars will require little if any change

to the bonnet edge, larger more upright cars will require up to 15cms of crush depth.

3. IMPROVEMENTS TO THE BONNET TOP

The final contact in a pedestrian accident is normally that of the upper body and head striking the bonnet top, the scuttle (area between the rear of the bonnet and the bottom of the windscreen), the windscreen or windscreen frame. The location of the head impact is dependent on pedestrian stature and motion, the position of impact across the width of the car and the size and shape of the vehicle involved. Therefore, a large area of the bonnet top can potentially be hit in pedestrian accidents.

To make the bonnet area safe for head impacts requires a crush depth of about 5 to 7.5cms and suitable bonnet strength. Large areas of car bonnets are already of about the correct strength, for these areas all that is required is that a crush space is left between the bonnet skin and strong engine or suspension components. Some parts, such as the wing edges and base of windscreen, are strong because they form a strong box where they join. Minor modifications to the joining of the sheet metal are required to help these parts collapse more easily.

CAN IT BE DONE?

The UK Transport Research Laboratory produced an experimental vehicle with pedestrian protection as long ago as 1985 and based on an existing design of car. Contrary to fears expressed by the car industry, TRL demonstrated fifteen years ago that even for existing designs most of the changes required could be met, without compromising styling.

TRL experimental vehicle

(Insert picture here)

It is expected, however, that any changes made to vehicle design would be required at

the initial design stage, rather than to existing models. In this way, any costs can be more easily assimilated. In addition the design choices to be made by the manufacturer to meet the performance requirements can be increased.

If the European car industry has not yet shown how it intends to benefit from all the European investment in research and development, Japanese manufacturers seem about to do this. A new Honda Civic model is to be presented to the European market this year which is expected to have a top pedestrian test rating in the EuroNCAP tests.

EUROPEAN CAR MANUFACTURERS ASSOCIATION PROPOSALS FOR A VOLUNTARY AGREEMENT

The European Car Manufacturers Association (ACEA) has for over twelve months been actively discussing a proposal for a voluntary agreement as an alternative to legislation. The Commission's Joint Research Centre (not known for its expertise in this area) has evaluated this proposal and suggested only small changes. ETSC's vehicle safety experts involved in the pedestrian safety research have evaluated these proposals as follows.

Will the voluntary agreement proposals lead to an equivalent level of protection ?

- Fewer tests In the industry proposal the number of tests to be passed would be reduced from four to two, leaving out the bonnet leading edge/upper leg test and using one head test rather than two. Experts believe that removal of the fourth test means failure to protect pedestrian upper leg and pelvic injuries which can be disabling and costly. Secondly, if the upper leg test is left out, improvements made to the bumper from the lower leg test would increase the number of these injuries in many cases. This would make things worse than they are at present. Since car manufacturers will have to weaken areas of the bonnet and the bumper to pass the head and lower leg tests, they may decide to stiffen the bonnet leading edge area to compensate and this would increase further the risk of injury in most cases.
- Weaker tests In addition to a reduced number of tests, industry has proposed that the severity of the tests be reduced. The level of protection for adult and child head injuries and leg injuries would be halved in the industry proposal which is an

unacceptably low level of protection. In addition the proposed changes in the lower leg test would change the type of injuries sustained from simple fractures to costly and disabling ligament injuries in many cases.

The voluntary agreement proposal will not deliver an equivalent level of protection compared with the take up of the four EEVC tests agreed in the 22 year EU research programme.

Will it deliver protection more quickly even though flawed?

- Lead times Even the voluntary agreement proposal has a lead time – new designs of cars from 2005. It will take time to set up, problems of ensuring compliance will need to be resolved and arrangements with non-European car industry associations will need to be made. ETSC notes that a draft legislative proposal which went to an informal inter-service consultation last November which incorporated four tests envisaged a lead time for new designs of cars starting in 2006 and ending in 2008.
- Recent experience with the EU front and side impact legislation showed that, within twelve months of good legislative requirements being assured, one car manufacturer after the other presented cars onto the market which more than met the legislative requirements, despite earlier statements that this was impossible. ETSC believes that the same thing will happen with safer car fronts for pedestrians and cyclists making a voluntary agreement unnecessary.

In conclusion, ETSC does not support this voluntary agreement proposal because it picks and mixes with the scientifically established EEVC tests and will fail to deliver a high and equivalent level of protection to that offered by those EEVC tests.

VIEWS OF MEMBERS OF THE EUROPEAN PARLIAMENT

As the European Parliament's Committee on Regional Policy, Transport and Tourism agreed on priorities for EU road safety action, MEPs warned that one more backtrack by the European Commission would leave a road safety policy without teeth.

MEPs' first priority for immediate legislative road safety action is to see a proposal for a

Directive on safer car fronts for pedestrian and cyclists. They warned Vice President Loyola de Palacio that if the Commission chose a voluntary agreement over legislation on safer car fronts, then this would be the second major backtrack on road safety in 12 months (the first being on blood alcohol limits). MEPs also urged the Commission to set a numerical target to the year 2010 to cut road deaths.

Ewa Hedkvist Petersen MEP (PSE), the Swedish rapporteur for road safety said: "It is clear that we do not have to accept the loss of so many lives every year when cost-effective and publicly acceptable solutions exist. For example, our two priority EU actions - safer car fronts for pedestrians and cyclists and a common blood alcohol limit could save 3,000 lives and many more thousands of injuries. In choosing a recommendation rather than legislation on blood alcohol limits, the Commission has backtracked on one major element of road safety policy. Every month of delay in introducing the safer car fronts' legislation means the loss of over 170 lives".

Mark Watts MEP (PSE) UK: "Of all legislative actions on transport safety, pedestrian and cyclist friendly car fronts is the most important on the current EU agenda. If the Commission choose a voluntary agreement over their long promised legislative proposal, then it would be the second backtrack in 12 months and the EU road safety policy will be in tatters. The voluntary agreement proposed by the European car industry reduces the number and quality of crash tests and would lead to a 50 per cent reduction in protection which is unacceptable. The UK Government in its road safety strategy states that as many as 20 per cent of pedestrian deaths could be saved by a good legislative proposal.

Dr Dieter Koch MEP (EPP) D: "While the highest risks faced by EU citizens in road traffic are in southern Europe, it is Germany, France, Italy, Spain and the UK which account for 75 per cent of EU road deaths and which have the most to gain from legislation on safer car fronts for pedestrians and cyclists. A Directive on safer car fronts is important and could save one life almost every day in Germany. In June, the Council of Ministers urged the Commission to finally come forward with a Directive – not a voluntary agreement. Commissioner Liikanen promised us a Directive last Spring - we are still waiting!"

Marieke Sanders-Ten Holte MEP (ELDR) NL: "We in the Netherlands take the saving of lives in traffic very seriously and we fully

support the idea of an EU target set to reduce road deaths to sharpen up activity. Every country is reliant upon effective EU action in certain areas especially where the Commission has the exclusive legislative responsibility. The potential to save 2,000 lives and over 18,000 severe injuries a year across the EU from legislation on safer car fronts is too important and the Commission cannot let industry lobbying override the safety of citizens.”

Theodorus Bouwman MEP (Greens) said: “There’s clearly imbalance, especially in urban areas, between the safety of vulnerable road users such as cyclists and pedestrians and the mobility of vehicle users. The EU has an opportunity, in one single measure – legislation on safer car fronts - to offer substantial protection to those outside the vehicle as well as those inside – car occupants - who are around eight times safer.”

THE 22 YEAR RESEARCH PROGRAMME – A CATALOGUE

- 1978** -Large EC and national government funded research programme by research laboratories across Europe (EEVC) starts accident research and dummy development for pedestrian protection. Reported in 1982.
- 1979** -UK in-depth accident research documents the problem of deaths and injuries resulting from pedestrian/car impacts.
- 1985** -UK Department of Transport proposes simple test methods for pedestrian protection.
-TRL demonstrates pedestrian-friendly car (Austin Metro) to ESV Conference, Oxford.
- 1987** -ERGA Safety - A Commission Advisory Group discusses proposal and recommends further work by the EEVC to develop suitable legislative tests.
-With part funding from the Commission, EEVC sets up Working Group 10 to develop pedestrian crash test procedures.
- 1991** June. EEVC Working Group 10 completes studies and presents proposals for test methods to an ESV Conference, Paris.
- 1992** -Based on the EEVC proposals, the Commission prepares a draft proposal

for a Directive (Doc III/4025/92) Brussels.

-Negative benefit to cost study published by ACEA, the European Car Manufacturers Association puts an end to discussion on the Commission draft.

- 1993** -UK Transport Research Laboratory publishes positive EU-wide benefit to cost study on EEVC tests.
- 1994** -EEVC Working Group 10 publishes further report validating test methods and developing test tools.
-Dutch Institute for Road Safety Research publishes positive national benefit to cost study on EEVC tests which also highlights additional savings to cyclists.
-German Federal Highway Research Institute publishes national benefit study of EEVC tests.
- 1996** -In January Commission presents legislative proposal for discussion. Later that year, it decides an independent study to assess the existing cost benefit studies is necessary.
-Honda demonstrates pedestrian-friendly car to ESV Conference, Melbourne which is said to meet most of the EEVC tests.
- 1997** -January. Commission awards cost benefit study to UK Motor Industry Research Association (MIRA) (which represent the UK car industry in Governmental discussions on EuroNCAP !).
-EEVC Working Group 17 invited to review Working Group 10 test methods.
-February. EuroNCAP consumer information test programme shows 7 cars performing generally poorly in the 4 EEVC pedestrian protection test procedures.
-April. Road safety communication highlights need for pedestrian protection in the programme and Parliament’s opinion puts safer car fronts at the top of the road safety agenda.
-July. Transport Commissioner, Neil Kinnock states that Commission will publish a legislative proposal in 1998.
- 1998** -January. Commission published first MIRA report showing that the costs exceeded the benefits. ETSC shows

costs are overestimated and benefits underestimated in the report. MIRA report addendum later revised benefits estimates. Initially the study reported lowest cost-benefit ratio of 5.3:1 which was later revised to 1.7: 1. Costings data not published, so difficult to scrutinise.

1999 -January. Fifth set of EuroNCAP results published showing cars performing badly in pedestrian tests. The European Commission supports EuroNCAP.

-January. EU Transport Commissioner announces that the Commission will publish a proposal in 1999.

-February. The EEVC reports to the Commission having completed minor revisions to earlier tests.

-June: The Commission holds meeting in Brussels to discuss EEVC tests.

-December: Commission announces that it will consult Member States again on draft proposal' probably available in March 2000. In December and January ETSC and MEPs visit Commissioner Erkki Liikanen who promises proposal in Spring.

2000 -January. Transport Commissioner Loyola de Palacio tells Parliament that the new Commission will propose legislation.

-February. EuroNCAP results on small cars indicate continuing poor performance in the pedestrian tests.

-March. The Commission formally states intention to introduce legislation as one of 6 cost-effective road safety measures in new communication

-June. Council of Ministers adopts resolution urging the Commission to bring forward as soon as possible a

Directive on safer car fronts to protect the lives of pedestrians and cyclists.

-July. Still no proposal. Many more meetings of industry with Commission. No industry proposal has yet matched equivalence in safety of the 4 EEVC tests.

-August. Commission asks its Joint Research Centre (not known for its technical expertise in this area) to evaluate on technical grounds the ACEA proposal for a voluntary agreement

-September. Vice President de Palacio continues to promote need for type approval legislation, while Commissioner Liikanen says he wants a new approach to vehicle safety and favours the idea of a voluntary agreement. A letter from MEPs from all parties demands intervention from President Prodi.

-October. High level group on road safety (representatives of Member States) renews support for legislative proposal. ETSC states that the industry voluntary agreement proposal would lead to 50% less protection and would make some injuries worse than at present. New ETSC estimates of 2000 deaths and 18000 severe injuries prevented by adoption in legislation of 4 EEVC tests.

-December. MEPs renew call for legislation on safer car fronts as top safety priority. European Commission gives industry a further 6 months to come up with a satisfactory voluntary agreement or face legislation.

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