



**Demonstration of the
implementation of the new thorax
protector in the existing garments**

D 4.3.3.C

Project no. **FP6-PLT-506503**

APROSYS

**Integrated Project on
Advanced Protection Systems**

Instrument: **Integrated Project**

Thematic Priority 1.6. Sustainable Development
Global Change and Ecosystems

Due date of deliverance: 08/2008

Actual submission date: 12/2008

Start date of project: **1 April 2004**

Duration: **60 months**

Dainese S.p.A.

Revision: **Final**





European funded project
TIP3-CT-2004-506503

APROSYS SP 4

Demonstration of the implementation of the new thorax protector in the existing garments

Technical report

Appendix of Deliverable "D 4.3.3.C"

AP-SP4-0020

Confidential level: Public/Consortium/Subproject

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Modifications:								
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C.								

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Publishable summary

This document entitled “Description on demonstration of the implementation of the new thorax protector in the existing garments” has been carried out within the Subproject 4 “Motorcycle Accidents” of the APROSYS IP.

This report describes the deliverable 4.3.3 C (which is represented by the garments themselves, related to the male version).

The aim of this deliverable is to demonstrate that the thorax protector developed in SP4 should be integrated in different existing garments aiming to improve the diffusion of this safety device. The motorcycles market is composed by different products’ families; each one family is well characterized by the product’s use. As a products’ family has a use destination, consequently the garment must achieve different characteristic in order to satisfy the different needs.

A segmentation of the market was done and related types of protective clothing were identified. From this point, a series of new safety clothing was developed.

Except the thorax protector (D.4.3.3), all the other protectors mentioned in this document and the garment presented, are developed outside the APROSYS project by Dainese S.p.A. and they are property of Dainese S.p.A..

Prototypes manufactured within this D-4.3.3C of the APROSYS Project are archived c/o Dainese S.p.A. via dell’Artigianato, 35 I-36060 Molvena (VI) Italy.

Acknowledgement

Following participants contributed to this deliverable report.

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1 DEFINITION OF THE MAIN TYPE OF MARKET SEGMENT

1.1 Main market segmets

The motorcycle's market can be in depth divided in the following segments:

- SCOOTER
- NAKED
- TRAIL
- SUPER SPORT
- CHOPPER
- QUAD / ATV
- ENDURO
- TOURING
- SPORT TOURING
- TRIAL
- CROSS

It has also to be highlight that this is a quite detailed market division, and from the point of view of clothing equipments, the rider needs can be grouped between different categories. As in some cases, the differentiation of the market above described depends on style issue. In Table 1 the market share for each type of motorcycle is presented (Data showed are related to year 2007).

Motorcycles	Market share
SCOOTER	41,2%
NAKED	18,0%
TRAIL	10,4%
S.SPORT	9,5%
CHOPPER	7,2%
QUAD/ATV	4,1%
ENDURO	3,3%
TOURING	2,4%
SP/TOUR	1,2%
TRIAL	0,6%
CROSS	0,2%
UNKNOWN	1,9%

Table 1 Source: Giral SA (Geneva International Research Associates LTD)

2 TYPE OF GARMENTS

Different destinations of the use of the motorcycles mean different riders needs and different ways to use the two wheels vehicles. This has an impact on the needs of clothing equipment. Scooters, for instance, are usually used for moving inside the city, for short ray trip. These users normally use the 'two wheels' to switch from home to the office and they need to use their normal dress. In case of touring motorcycle, riders take long trip, and enjoy their trip. These users need a full protective garment, able to protect theme from the whether condition and from the risk connected to the motorcycle's use.

Taking into account all the possible different rider's needs, matching theme with the typical garment they use, four basic concepts new gear, equipped with the new thorax protector, can be developed. In the follow paragraphs each garment will be describe in details.

2.1 Thorax PLUS BACK protector

This special garment is equipped with a couple of passive safety protectors, able to reduce the risk of injuries in thorax and back area.

- Compatibility with other garments: this configuration allows the use of this special protection system under a common motorcyclist's jackets or suits. In fact these clothing are always equipped with shoulder and elbow protector, but there is no any interference with this new protective device. But the garment can be also used itself as it is equipped with autonomy retention systems.
- Retention systems: the safety jacket is provided with special systems that allow keeping the protector in contact with the body structure. The wearer has also the possibility to customize the thorax height position thought the regulation system, and to adapt the wear-ability to its waist by the thorax and back protector adjustable belt.
- Thermal comfort: a special "bubble" fabric used to build this garment guarantee the maximum level of breathability.

In Figure 1, 2 and 3, this protector is shown.



Figure 1



Figure 2



Figure 3

2.2 FULL SAFETY garment

Special full safety garment equipped with passive safety protector able to reduce the risk of injuries in the body follow body regions: shoulder, elbow, thorax and back area.

- Compatibility with other garments: this garment configuration is very complete and for that reason it can be used under only jacket not equipped with any protector, otherwise there is an overlap of protection. The most frequent use of this device is alone as it provides a complete torso area coverage and it is very light and breathable and for those reasons fit, particularly for motorcycle off road and other sports like sky and cycling.
- Retention systems: the safety jacket is provided with special systems that allow keeping the protector in contact with the body structure. The wearer has also the possibility to customize the wear-ability to its body thought the regulation systems that are available for all the garment protectors. Elbow protectors have micro adjustment systems in order to be fitted to forearms girth. Back protector is equipped with adjustable braces and adjustable belt. Thorax position can be regulated by two strings and has its own adjustable belt.
- Thermal comfort: Thorax protector has special “bubble” fabric in the side of the body. Back protector is completely ventilated by a series of hole and the garment is realized with a special elastic net stitch that allows complete breathability.

In Figure 4, 5 and 6 the safety gear is shown.



Figure 4



Figure 5



Figure 6

2.3 LIGHT Waistcoat

Very light and breathable waistcoat with a thorax and back protector integrated inside two pockets.

- Compatibility with other garments: this configuration is very easy to wear and it can be used during hot period over common dress. This peculiarity gives it the characteristic to be used during short ray trip. As this protection system is very light, it doesn't crumple the dress worn under it.
- Retention systems: the waistcoat has a zip to close the clothing and three strings for each side that allow closing the waistcoat to the waist girth.
- Thermal comfort: Thorax protector has special "bubble" fabric in the side of the body and the waistcoat is built with breathable fabrics.

Figure 7, 8 and 9 show the waistcoat.



Figure 7



Figure 8



Figure 9

2.4 TOURING jacket

Touring jacket for wide range trip equipped with shoulder, elbow, thorax and back protector. All the protectors are integrated inside a series of dedicated pockets.

- Compatibility with other garments: as this is a jacket, it can be worn over normal dress.
- Retention systems: Only the back protector is equipped with an adjustable belt. In order to have a good area covering, the wearer has to select the right garment size. The garment is however equipped with different regulations around the neck, the wrist and the side.
- Thermal comfort: Inside the jacket a special lining treated help to extract the vapour from inside the jacket,

Figure 10, 12 and 13 show the Touring jacket. Figure 11 shows the position of the Thorax inside the jacket. Figure 14 gives a vision of the jacket's interior.



Figure 10



Figure 11



Figure 12



Figure 13



Figure 14

3 MARKET COVERAGE

Each garment, described in the previous chapter, satisfies the needs of almost all the types of users. In particular, different destinations of using a motorcycle correspond to different needs in terms of wear-ability, in terms of protection from the weather condition, compatibility with other dress or protection systems worn. In order to define potential market coverage, a match between different developed garments, and the standard market division was done.

In table 2, the matrix matches each protective garment with the potential market segments covered. Also different sports were included in the figure as this protector should potentially be used by also these targets of people. Motocross was skipped in the potential matching as this sport is performed on the track and its needs in terms of protection is very specific, in fact the protectors used in this sport are light stone shield.

		D-433	D-4.3.3 C			
		Thorax protector	Thorax Plus Back	Safety Jacket	Waistcoat	Touring Jacket
MOTORCYCLE	SCOOTER				X	
	NAKED	X	X		X	X
	TRAIL	X	X			X
	S.SPORT	X	X			
	CHOPPER	X	X		X	X
	QUAD/ATV	X	X	X		
	ENDURO	X		X		
	TOURING	X	X			X
	SP/TOUR	X	X			
	TRIAL			X		
OTHER SPORTS	SKY	X	X	X		
	CYCLING	X	X	X		

Table 2

4 CONCLUSION

The new Thorax protector developed within the Subproject 4 "Motorcycle Accidents" of the APROSYS IP, shows that its use increase the level of safety of a motorcycle riders by reducing the risk of sustaining thoracic injuries in case of accidents. The aim of this deliverable D4.3.3 C entitled: " Demonstration of the implementation of thorax protector in existing garments" is to find different way to wear the protectors, not only considering it as a autonomy protection, but considering it as a part of a garment. A series of four different garments was developed and, taking into account their normal destination of using, there should be a potential complete market covering.