



LIFE Project Number  
**LIFE02 ENV/FIN/000329**

**PROGRESS REPORT No. 3**  
**Covering the project activities from 1.10.2003 to 31.3.2004**

Reporting Date  
**26.04.2004**

LIFE PROJECT NAME

**Kukkia Circlet:**  
**Environmentally friendly systems to renovate secondary roads**

Data Project

Project location	Finland / Pirkanmaa	
Project start date:	1.12.2001	
Project end date:	31.12.2004	Extension date: -
Total Project duration (in months)	37 months	Extension months: -
Total budget	1.253.630 €	
EC contribution:	626.815 €	
(%) of total costs	50 %	
(%) of eligible costs	50 %	

Data Beneficiary

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## Executive Summary

The project, Kukkia Circler, has been progressing as planned for the most part. This third Progress Report will cover the period from 1<sup>st</sup> October 2003 to 31<sup>st</sup> March 2004, a period of follow-up of the pilots, the reporting of Pilot 2003 and the preparing for the final project year and dissemination.

During the reporting period, follow-up tests have been conducted on Pilot 2002 and Pilot 2003 test sections (interim follow-up report in Finnish and English will be finished in April), the Steering Group has had one meeting (9.12.2003), report of Pilot 2003 has been finalised in Finnish (the English version is pending and is planned to be finalised in April 2004), the project website has been updated, the video (the final copies as dvd- presentation) for dissemination has been given its final touch, and the dissemination event at the workshop in June 2004 has been prepared. The Guide is still pending but will be available as a draft in June 2004.

Major changes have been made in the project organisation as Seppo Kolkka, the project manager until 29<sup>th</sup> February 2004, moved to a new company and position. The responsibilities of the project manager have been taken over by Ms Hannele Kulmala, the head of Häme Service Unit of the Finnish Road Enterprise, since the 1<sup>st</sup> March 2004. The Häme Service Unit covers the regions of both Pirkanmaa and Häme, after the new organisation within the West Finland Area of the Finnish Road Enterprise.

The project deliverables until the end of March 2004 are available at project **website** (see: [http://www.tieliikelaitos.fi/5\\_4.asp](http://www.tieliikelaitos.fi/5_4.asp)).

The **costs** of the project, incurred from the 1<sup>st</sup> December 2001 until 31<sup>st</sup> March 2004, are roughly 1 056 000 Euro (about 84 per cent of the budgeted 1 253 630 Euro).

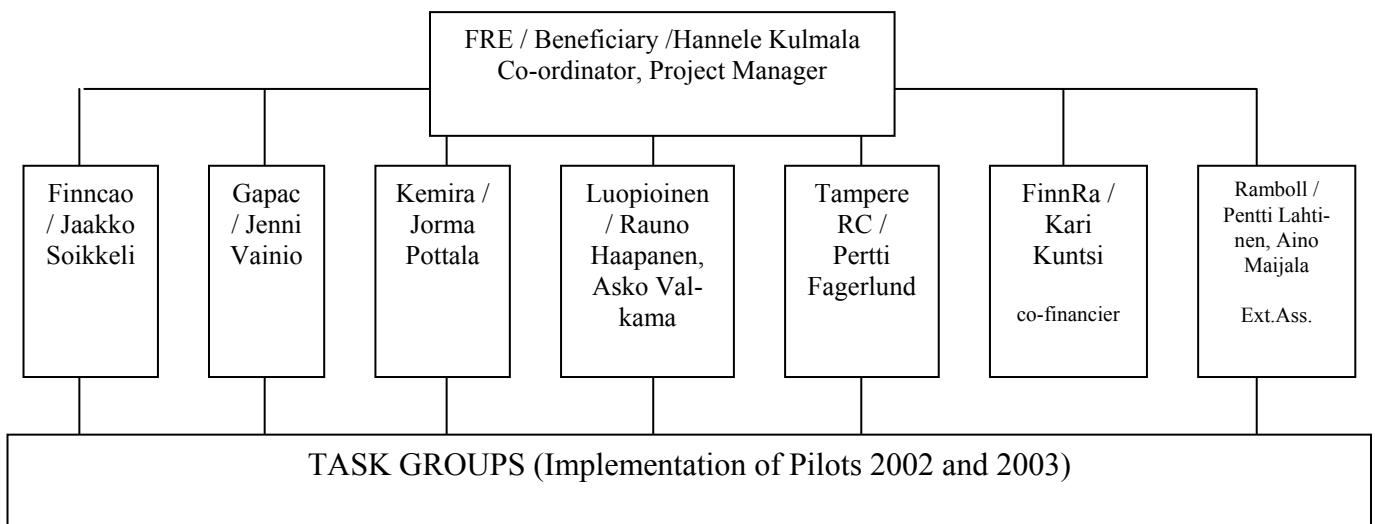
Tampere 26<sup>th</sup> April 2004

Hannele Kulmala

# 1. Project management

The project manager of Kukkia Circlet LIFE 02/ENV/FIN/00329 until 29<sup>th</sup> February 2004, Seppo Kolkka, has moved to a new position as technical director in Hämeen Kuljetus Oy. MSc, Ms Hannele Kulmala, the head of the Häme Service Unit of the Finnish Road Enterprise continues as the project manager since the 1st March 2004.

The description of the project management system is below as a scheme. Senior representatives (like project contact persons) of the beneficiary and the partners, and the external assistant, Viatek (Ramboll since 1.4.2004), are the members of the Steering Group (SG). The work groups for the implementation of the pilots are composed of the relevant professional expertise of the organisations, mainly being personnel of FRE, Luopioinen and Viatek. Finncao, Gapac and Kemira have taken care of the by-product materials, their quality control and tests. Tampere RC has acted as observer and provided help for the production of video tools for the dissemination. FRE, Luopioinen and Tampere RC have also hired or financed students and other young unemployed but professional persons to work for the project and to learn about the new innovative methods, structures and production processes.



SG has had one meeting during the reporting period: on 9<sup>th</sup> December 2003. The memoranda of the meeting (in Finnish) are available to the SG on the project website.

Since the start of the project, the project **deliverables** have included the technical designs and work instructions of Pilot 2002 (in Finnish), the 1<sup>st</sup> Progress Report (from the start until 30<sup>th</sup> September 2002), the Interim Report in March 2003, Technical Report on Pilot 2002 and the project in general (annex to Interim Report), the technical designs and work instructions of Pilot 2003 (in Finnish), the 2<sup>nd</sup> Progress Report and the Pilot 2003 technical report in Finnish. The above mentioned reports are available on the projects website.

## 1. Technical Development

### **Tasks 1: Material tests**

The Task 1 has been finished and reported in the Progress Report 2 (October 2003).

### **Tasks 2: Pilot 2002 Planning and Task 3: Pilot 2002 Construction**

Tasks 2 and 3 have been finished and reported in the Interim Report (March 2003)

### **Tasks 4: Pilot 2003 Planning**

Task 4 has been finished and reported in the Progress Report 2 (October 2003).

### **Task 5: Pilot 2003 Construction**

Details of the construction process have been described in the Pilot 2003 report, and also in the Progress Report 2 (October 2003). The Finnish version is available at the project websites since March 2003. Most important notes during and after the construction are as follows:

#### **In general:**

- It is possible to use available construction equipment for the different types of structures tested during the project. However, it would be advantageous to develop especially the spreading technology further (e.g. compatibility for different construction widths and combination of spreading and compaction).
- The fibre-ash course needs a thin course of crushed aggregates for the compaction. Also any heavy loaded trucks should not run over the fibre-ash course before compaction.

#### **Light-traffic lane (see Figure 1):**

- The spreading of fibre-ash will be more efficient and the quality of the work with respect to the course thickness and width better in case there is available spreading equipment suitable for narrow lanes. The available trucks and planers were too wide. The best machinery would be similar to the asphalt pavement equipment.



**Figure 1: Light-traffic lane in Luopioinen in August 2003. Only the final covering course is missing.**

**Safety lanes (see Figure 2):**

- The pilot work of safety lanes was very slow as the equipment and methods were not adequately developed. The support plate is very important with respect to the quality of the construction. However, there was only one support plate (5 meters long) available; the process would need at least four support plates that can be moved by turns according to the progress of the process.
- The main road is paved. Therefore, also the safety lanes have to have a pavement course of bound materials (like bituminous asphalt concrete) in order to avoid erosion and other damage to it.



**Figure 2: The support plate for the safety lane construction, and compaction on a crushed aggregate course. Luopioinen 2003**

### **Renovation of the gravel road, Pihtisalmentie (see Figure 3).**

- This work could be carried out without problems and much more efficiently than anticipated. It could be possible to renovate even three kilometres of gravel road each workday with this kind of method in case the mixing site is close by the construction site. The efficiency of the mixing method and the distance between the mixing site and construction site are very decisive factors of the process efficiency.
- The fibre-ash course is quite tight and water impermeable. Therefore, adequate angles of inclination are needed for the rain water to run to the sides of the road.



**Figure 3: Compaction of the fibre-ash course covered with crushed aggregates. Luopioinen 2003.**

### **The groundwater protection structure (see Figure 4):**

- In case of bigger construction project than for this pilot, there will be need for interim deposits for the soil removed from the groundwater protection structure area.



**Figure 4: Compaction of fibre-clay for the impermeable sealing course of the groundwater protection structure. Luopioinen 2003.**

Like informed in the Progress Report 2, the finishing (the raised, serrated strips for safety lanes to separate the lanes from the driveway and the pavement of the safety lanes) could not be totally performed before the snow and cold arrived in Finland in October 2003. Therefore, these will be carried out during spring 2004, as soon as possible.

**Task 6: Impact Assessment**

Since the beginning of October 2003, the task has involved following measures:

- Visual check of the pilots’ quality during the autumn and winter time
- Measurements of bearing capacity (falling weight method)
- Testing of drilled samples taken from the different pilot structures
- Analysis of water and soil samples taken from the environment of the pilots
- Drafting of the Interim Impact Assessment report

The Interim Impact Assessment report is given as the **Annex** of this Progress Report.

The economic impact of the new technology has not been included in the Interim Impact Assessment Report, but it seems that the economically most competitive processes will be the renovation of the secondary roads with help of stabilisation (Pilot 2002) or with new structural fibre-ash courses (Pilot 2003), and the separate light-traffic lanes (Pilot 2003). The feasibility of the ground-water protection structure will be based on its ability to meet the requirements for water impermeability ( $k \leq 1 \cdot 10^{-9}$  m/s), and the feasibility of the safety lane systems may depend on the development of more efficient technology for the construction process. The economic assessment of Pilot 2003 is given in the table below (Seppo Kolkka 9.12.2003):

	LIFE-demonstration		Assessment for actual production	
	Costs	Costs	Costs of project length	Costs
	€	€/km, * €/m <sup>2</sup>	€	€/km, * €/m <sup>2</sup>
Renovation of a secondary road	86 559	91 115	68 106	68 106
Safety lane (both sides of the road)	232 184	55 282	199 345	47 463
Separate light-traffic lanes	91 561	78 932	69 667	69 667
Groundwater protection structure	12 559	*83,73	9 362	*62,41

**3. Problems encountered**

Like stated before, during the implementation there are surprises and events – even new needs and ideas for testing - that could not be taken into account when making the plans and budgets for the project in 2001. Thus, we have found that the time schedule and the cost budget are the major problems of the project. So far, however, the problems have not caused need for major project modifications.



## 4. Dissemination

The preparations of the papers and other presentations for the workshop in June are going on.

The drafts of the edited videos have been shown to and accepted by the Steering Group in December 2003, and the DVD-editions will be available for distribution at the workshop and thereafter. The DVD-edition will be finalised during the spring 2004 as soon as the Pilot 2003 finishing works have been carried out.

## 5. Envisioned progress up to 30.9.2004 (next 6 months)

### Task 5: Pilot 2003 Construction

The finishing of the Pilot 2003 constructions will be carried out during spring 2004.

### Task 6: Impact Assessment

The interim report of the Impact Assessment was not finalised during the reported period, but the English version is given as Annex of this Progress Report 3, and both the Finnish and English versions will be available at the project websites in May 2004.

The follow-up studies at the project sites will continue until the end of the project period, and partially also thereafter. The follow-up programme is as follows:

PILOT 2003	Method	Responsible	Year / quarter															
			03				04				05							
			1	2	3	4	1	2	3	4	1	2	3	4				
Quality check	visual	FRE,		E		x				x								
Bearing capacity	falling weight	FRE				x				x								
Studies of structures	Testing of drilled samples	FRE				x					x							
Water samples	Analysis of inorganics	Ramboll			E							x					x	
Soil samples					E								x					x
PILOT 2002	Method	Responsible	Year / quarter															
			02				03				04				05			
			4	1	2	3	4	1	2	3	4	1	2	3	4			
Quality check	visual	FRE	x			x												
Bearing capacity	falling weight	FRE								x								
Studies of structures	Testing of drilled samples	FRE										x						
Water samples	Analysis of inorganics	Ramboll	E				x											x
Soil samples			E				x											

E = reference before Pilot construction

The **independent external evaluators** of the project results were chosen at the SG meeting 2<sup>nd</sup> April 2004 (this is after reporting period). The evaluators are from the Finnish Environment Centre, the Finnish Road Administration and the Technical University of Tampere. The evaluators will get all the reports and any other data of the project they require (if available). They will have guided visits to the pilot sites. Also, there will be individual meetings with each of the evaluators, and we hope the evaluators will participate the final steering group meeting in September 2004. In the autumn 2004 the evaluators will comment the final Impact Assessment Report and give statements with respect to the project and the feasibility of the pilot constructions.

Additional evaluators will be the local users of Pilot 2002 and Pilot 2003 test roads and light-traffic lanes. A questionnaire survey on the opinions about the different light-traffic lanes will be performed in the autumn 2004.

The final Impact Assessment report at the end of 2004 will include the statements of the independent external evaluators, the results of the questionnaire study and any other user comments available before the project has been finished.

### ***Task 7: Dissemination***

The workshop will be a part of the international Symposium of ISEG on Environmental Geotechnology and Global Sustainable Development on 8. – 10 June 2004. The preparations for the workshop are going on (presentations will include papers and video/dvd-presentations).

The Guide has been planned to be an electronic file, available at the project website, and it will be based on the experience and results during the implementation and follow-up of Pilot 2002 and Pilot 2003. The draft of the Guide will be available in June 2004 and presented at the workshop.

The dvd-presentations will be finalised and available for the public during the workshop in June 2004.

### ***Task 8: Management and reporting***

The Steering Group had its meeting in April 2004 and the finishing meeting in September 2004.

The Technical Report of Pilot 2003 and the Interim Impact Assessment report will be available at the project website in May 2004.

The Progress Report Nr. 4 for the period 1<sup>st</sup> April– 30<sup>th</sup> September 2004 will be prepared and submitted to the Commission in October 2004.

## 6. Financial issues

Cost category	Total cost according to the Commission's decision* [€]	Costs incurred from the start date to 31.3.2004 [€]	% budget
1. Personnel	305.834	209.234	68
2. Travel	17.750	16.866	95
3. External assistance	415.903	394.828	95
4. Durables: total <u>non-depreciated</u> cost	-	-	-
- <i>Infrastructure sub-tot.</i>	-	-	-
- <i>Equipment sub-tot.</i>	-	-	-
- <i>Prototypes sub-tot.</i>	-	-	-
5. Consumables	417.903	368.321	88
6. Other costs	63.000	50.241	80
7. Overheads	33.797	16.431	49
<b>SUM TOTAL</b>	<b>1.253.630</b>	<b>1.055.921</b>	<b>84</b>

The project has met 84 % of the total budgeted costs on 31<sup>st</sup> March 2004. The final targeted total costs of the project will be approximately like budgeted, and include the costs of finishing the Pilot 2003, the follow-up for impact assessment, and the dissemination and the reporting of the project. The overheads have not been included by the partners' financial reports, yet, but will be calculated for the final financial report. The final relative share of each cost category at the end of 2004 will be close to the original relative share indicated by the figures in the Commission's decision in 2001.

## 7. Progress until 31<sup>st</sup> March 2004 and planned activities

Following table describes the progress until 31<sup>st</sup> March 2004 and the envisioned progress for the rest of project period

LIFE02 ENV/FIN/329		Kukkia Circelet															
Tasks		2001				2002				2003				2004			
		1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T
Overall schedule of Progress reporting	Base				S			X			X		X		X		X
	Actual				S			X			X		X		X		x
1. Material tests	Base				XX	XX	XX	XX									
	Actual				XX	XX	XX	XX	XX	XX	XX						
2. Pilot 2002 Planning	Base				XX	XX	XX	X									
	Actual				XX	XX	XX	X									
3. Pilot 2002 Construction	Base						X	XX	X								
	Actual						X	XX	XX	XX							
4. Pilot 2003 Planning	Base							X	XX	XX	XX	XX					
	Actual							X	XX	XX	XX	XX					
5. Pilot 2003 Construction	Base										X	XX					
	Actual										X	XX			xx	x	
6. Impact Assessment	Base							XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
	Actual							XX	XX	XX	XX	XX	XX	XX	xx	xx	xx
7. Dissemination	Base							XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
	Actual							XX	XX	XX	XX	XX	xx	xx	xx	xx	xx

X = actual performance  
x = planned performance

### List of Annexes

Interim Impact Assessment Report. English