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## **Clothes make the man : early medieval textiles from the Netherlands**

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## **6. Early medieval textile remains from settlements in the Netherlands**

### **An evaluation of textile production**

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This article was in fact the first to be published for this PhD-thesis. It discusses the textiles that were found in settlements in the Netherlands, mainly from the north of the country. The finds from these settlements are numerous but not narrowly dated. It may be assumed that some textiles are contemporary but many are younger than those found in the cemeteries, which makes it difficult to compare them. The analysis of this large body of textiles has resulted in information about the way textiles were produced and sewn into garments. Moreover, it enabled an analysis of the degree of specialisation needed to produce these textiles.

## 6.1 INTRODUCTION AND RESEARCH PROBLEM

The last few decades saw an increase in research on early medieval textiles. After preliminary inventories and several publications on single sites,<sup>263</sup> the enormous survey of European textiles by Bender Jørgensen provided an insight into the development of cloth-production in this period for Northern Europe, including the Netherlands.<sup>264</sup> Still many questions remain relating to the technical and social aspects of the production and use of textiles and clothes in the Netherlands in this period. It is not clear how people were dressed and how social or economic differences were reflected in clothing. Neither do we know how textile production was organised within and between different types of settlements.

The aim of this research is to achieve a better understanding at a practical and theoretical level of the production, function and use of clothing throughout the early Middle Ages in the area now called the Netherlands. Looking beyond the practical function of clothing it can be seen that there are many social aspects to the way people make and wear clothes. The organisation of textile production is closely related to the way society was organized. By studying the way production took place it is possible to gain an insight into the social position of the craftspeople, ranging from domestic production for personal consumption to specialists supplying their goods to others. Clothes themselves are social markers as well. The identity of a person or a group of people is often reflected in the way they dress. Diversity and changes in clothing can therefore be related to the social structure of society and to changes that may have occurred in that society over time. This chapter aims to provide some answers to the problem of textile production by the analysis of the large number of textiles found in early medieval settlements in the Netherlands.

## 6.2 RESEARCH QUESTION, DATA AND METHODS

### 6.2.1 Research question

The main purpose of this chapter is to consider textile production in relation to the society in which it took place. How and where were textiles and clothes made and by whom? Was cloth production already specialized and related to an extensive trade network or was it a craft that mainly took place at the level of the household? To do so, it is necessary to reconstruct how textiles and clothes were made. It may be possible to identify indications for production other than for domestic consumption in early medieval society by the assessment of the degree of specialization in textile production.

There are several approaches considering textile production and questions relating to this subject. First of all, it is possible to study the textiles themselves. The analysis of the products of textile craftspeople may show us how the cloth was made. One can moreover ascertain the degree of specialisation needed to produce the textiles and the way these textiles would have been valued by the people using them. Another approach is to study the tools used to produce textiles, their development and distribution within a settlement, which may point to locations where different parts of the production process took place. A comparison of different settlements might even give information about the relative importance of textile production at these sites. Lastly, an evaluation of the access to the raw materials for textile production, like wool and dyestuffs, and indications for overproduction may give a view on the role of a settlement in any trading of textiles. This type of information may be acquired with a landscape-centred approach where well-documented bone spectra from different sites are available. The focus of this chapter is however, the textiles themselves.

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263. Schladow 1974 (textiles from the northern provinces); Zimmerman 2005 (Ulrum); Comis in prep. (Anjum); Miedema 1980 (Dorestad); Leene 1964 (Middelburg); Vons-Comis 1988, Van Es & Ypey 1977 (Zweelo).

264. Bender Jørgensen 1992.



## 6.2.2 Data

### 6.2.2.1 Quality

The textiles discussed in this chapter have all been found in settlements in the Netherlands. Most of these finds were uncovered in the dwelling-mounds (or *terpen*) of a predominantly rural society in the north of the country. These sites have yielded very few remains of burials, therefore the textiles are likely to have been deposited in settlements. A small percentage was found in major centres of a quite different character, such as Dorestad and Middelburg. Geographically and culturally the *terpen* differ from the towns of Middelburg and Dorestad. The *terpen* are considered to have more ties to Scandinavia, Northern Germany and Anglo-Saxon England. Dorestad and Middelburg, situated on the edge of the Merovingian and Carolingian empire, are likely to have been more influenced by the regions in the south.

The textiles uncovered in these settlements have properties that make them worth treating as a separate find category among the body of textile finds from the Netherlands, in contrast to the textile fragments that have survived in cemeteries through the corrosion of metal artefacts. Although the cemeteries offer much better information for a chronological framework for textiles in use and for reconstruction of clothes, they do not lend themselves easily to the examination of the entire process of production and use of textiles. Textiles found in settlements, on the other hand, contain information not only about how a fabric was spun, dyed and woven. They also give information about finishing processes and about how a fabric was put together, sewn, used and repaired. It is possible to cover a wide range of questions about the process of textile production on the basis of the often very large pieces of textile from the settlements.

Besides these advantages there are considerable disadvantages to deal with as well. Firstly, the textiles from the settlements are often poorly dated. This is related to the way many of these textiles have been recovered. The habitation of the earliest *terpen* dates back to c. 600 BC.

After the third century AD a decline in population commenced, followed by a phase of scarce occupation. Population increased only after the fifth century and the *terpen* have been gradually raised up to their present heights. At the end of the 19th century the soil that had accumulated for centuries had been discovered as a valuable fertilizer and therefore groups of diggers methodically dug away large parts of the mounds. These people sometimes had an eye for antiquities but as they dug straight from the top down, they could collect objects dating over 1000 years apart in one single day.<sup>265</sup> As a result there may be textiles in the dataset spanning approximately the period from 500 BC to 1500 AD. Excavated sites on the other hand do not have this dating problem. Dorestad is among these, as well as Middelburg and a few of the old *terp* excavations like Ezinge, Leens and Westeremden (table 6.1, \*). In some cases textiles are assigned to a period of several centuries, based on the fact that most other finds from these sites date from that period (table 6.1, \*\*). There are however also textiles that theoretically can be dated anywhere within the long period of habitation of a site. This makes it impossible to use this dataset as a whole to create a chronological framework for textiles in the early Middle Ages.

A second disadvantage is that there are only woollen textiles in the dataset. During the Middle Ages people wore clothes of animal fibres, such as wool and of fibres made of plants, like linen. Degradation of these fibres is caused by micro-organisms, oxidization and other chemical processes in the soil. Linen fibres break apart by a process of hydrolysis, which occurs under acid conditions. Wool on the other hand, like leather and fur, may dissolve completely in alkaline conditions and is much better preserved in acid soil.<sup>266</sup> These circumstances clearly do not mix, so generally only one of the two types is preserved at any one site. In every settlement that has been examined, soil conditions were acid, which means that the preserved textiles are made of wool. Information about linen could come from the cemeteries, which will be published in the next few years.

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265. Knol et al. 2005.

266. Huisman 2009.

## CLOTHES MAKE THE MAN

Site	Habitation period of site	Textiles are assigned to period:	N textile-fragments	N individual woven textiles	N individual cords, ropes and braids
Beetgum	350-900	350-500**	4	1	0
Blija	600 BC-900 AD	350-550**	2	1	1
Cornwerd	475-725	475-725**	7	0	2
Wetzens	350-900	500-900**	5	0	5
Jouwswier	350-900	500-900**	1	0	1
Kloosterwijtwerd	0-900	500-900**	5	4	0
Aalsum	300-900	500-700 and 750-900**	9	6	0
Dokkum, Berg Sion	500-900	Hat is dated between 568-651 cal AD; many textiles are associated with this find.	121	77	2
Westeremden	500-1000	500-1000**	44	26	1
Ulrum		600-800*	1	1	0
Leens		600-900*	94	42	10
Dorestad, Wijk bij Duurstede	600-900	600-900*	7	3	3
Oostrum, Mellemastate	500-900	700-900**	7	4	0
Oosterwijtwerd	350-900	700-900**	2	2	0
Anjum	700-1400	700-900*	1	1	0
Cornjum Dekema-/stoomterp	400 BC-900 AD	775-900**	6	3	1
Rasquert hat	350-900	Hat is dated between 800-900*	1	1	0
Middelburg	875-1600	875-1000*	28	12	0
Leeuwarden hoogterp	350-900		15	7	2
Ferwerd Burmaniaterp	200 BC-900 AD		20	12	3
Ferwerd Burmaniaterp II	400 BC-900 AD		1	1	0
Foswerd	350-900		6	4	0
Holwerd, dorpsterp	350-900		1	0	1
Menaldum	unknown		3	1	2
Kimswerd	300-900		2	1	0
Rasquert other finds	350-900		8	4	0
Sellingen/Zuidveld	350-900		3	2	0
Wijnaldum	100-1000		12	5	3
unknown, prov. Groningen	unknown		8	1	0
Teerns	200 BC-900 AD		2	1	1
Hoogebeintum	350-900		13	5	1
Wierhuizen	250 BC - 1300 AD		1	1	0

Total

440

229

37

Table 6.1 Early medieval sites in the Netherlands yielding textiles. The second column lists the entire habitation period of the site (after Taayke 1996; Knol 1993). The third column contains the period to which the textiles may be assigned. This is based on either excavation evidence (\*) or to the fact that the majority of finds from a site is dated in this period (\*\*).



Fig. 6.1 The textiles from Cornjum (objectnr. FM 120-411) were still in their package dating from the early 1900's.

Lastly, it must be considered that the textiles found in refuse layers in settlements are literally refuse. The fragments are generally heavily worn, re-used and finally discarded as rags, which makes it difficult to ascertain their original function.

#### 6.2.2.2 Dataset

The dataset consists of 440 fragments of 265 different textiles, from 31 sites (table 6.1). Of these textiles, 80 have been published before in more or less detail.<sup>267</sup> The others had until now not been analysed. Some of these were even in their original wrapped up state of the early 1900's (fig. 6.1), or were still adhering to the clay from which they had been recovered. As a consequence, these textiles had to be cleaned with demineralised water and dried flat before analysis could take place.

267. Schlabow 1974 (part of the finds from Leens, Westeremden, and a few other textiles from the northern provinces); Bender Jørgensen 1992 (part of the finds from Dokkum, Berg Sion); Zimmerman 2005/2006 (Ulrum); Comis in prep. (Anjum); Miedema 1980 (Dorestad); Leene 1964 (Middelburg); Zimmerman 2009 (hats of Rasquert and Leens).

The textiles may be divided into woven fabrics (226) and others like ropes, cords, braids and felt (39). The finds vary in size from small scraps of a few square centimetres to large pieces of approximately 40 x 35 cm in size. The textiles are probably not only the remains of clothes of the people inhabiting the settlements, but may also have been used for household needs such as bedding or sacking (see 6.4 for more information about the function of the textiles).

A group of 78% of the textiles can be assigned to a period of several centuries within the early Middle Ages. These finds will be presented in the following text, tables and graphs grouped per site in chronological order. The other 22% will be treated as a separate group as it is not certain whether they are early medieval or older.

#### 6.2.3 Methods

##### 6.2.3.1 Some central concepts: skill and quality

*In the following paragraphs the concepts skill and quality are mentioned several times.*

The Oxford English dictionary gives the following description for the noun skill: 1 the ability to do something well; expertise or dexterity. 2 a particular ability. Production of textiles was commonplace in early medieval society. Manufacture for daily clothes, household furniture, and sailing clothes must have taken up a considerable share of everyday life. From a study of working time, conducted in 1760, it is known that up until the 18th century women in South Sweden worked at least eight months a year on textile production for domestic needs only.<sup>268</sup> The techniques to make textiles were therefore widespread and imbedded in the entire society. Skill in early medieval textile production must be conceived as the ability to make textiles of a higher level, using refined techniques or expertise. Skill does not necessarily lead to finer textiles: there are many other reasons for which a textile may be

268. Andersson 2003.

1. Household production <ul style="list-style-type: none"> <li>• Production covers the household's needs</li> <li>• Household members possess the skills and knowledge needed</li> <li>• Raw material is commonly accessible</li> <li>• Knowledge of manufacturing process is widespread.</li> </ul>	2. Household industry <ul style="list-style-type: none"> <li>• Seasonal part-time production</li> <li>• Production scale beyond the needs of the household</li> <li>• Organised at household level</li> <li>• Surplus used for trade, exchange or tax</li> <li>• Production when spare time is available.</li> </ul>
3. Tethered specialisation: <ul style="list-style-type: none"> <li>• A craftsman is linked to a patron and produces solely for him</li> <li>• Production by specialist</li> <li>• Work is a full time occupation</li> <li>• Specialist skills are enhanced by full time occupation.</li> <li>• Better quality products</li> <li>• High quality products are used by the patron as desirable gifts</li> <li>• Control of the skilled specialist adds to the power of the patron</li> </ul>	4. Workshop industry: <ul style="list-style-type: none"> <li>• A financially independent craftsman</li> <li>• production for a market</li> <li>• this type of production requires large demands and a higher degree of social complexity</li> <li>• Products are made efficiently and standardized: the time and costs are reduced to a minimum</li> <li>• Full time production by a specialized craftsman</li> </ul>

Table 6.2 Characteristics of the different modes of flint production defined by Olausson (1997) and applied on archaeological textiles by Andersson (2003).

valued. The quality of a textile – and with that the way it was valued – depends on its properties in relation to the use of the textile. It is often a combination of several properties, which makes a fabric suitable for a specific use. In cases of clothing it is obvious that a fine and technically complex fabric is very suitable and valuable. Sailing clothes on the other hand would need completely other properties. A suitable sail cloth may very much resemble a fabric that in terms of clothing would be seen as of average quality.<sup>269</sup> The appearance of a textile may also be of significance because it can be just as important in signalling social status as the form or shape of a garment.<sup>270</sup> These properties are generally not easy to measure using standard analytical methods for archaeological textiles, for these methods may describe textiles as technically similar while the naked eye conceives differences.<sup>271</sup>

269. Cooke e.a. 2002.

270. Hammarlund e.a. 2008.

271. Hammarlund 2005.

#### 6.2.3.2 *Chaîne opératoire*

An important question is: how can one discern home craftsmanship from production for a textile market by studying the textiles themselves?

A useful tool to analyse textile production and specialization is the concept of *chaîne opératoire*, or operational sequence, which considers a production process as a sequence of (interrelated) actions, influenced by technical possibilities and personal and cultural choices.<sup>272</sup> This implies a study of the individual steps in the process of textile production, which makes it possible to evaluate every action and to discern the general mode of production. In each step one can ask whether producers had access to the same materials, skills and tools in the making of the final product. Although this is a somewhat technical approach, it is useful for possibly distinguishing ordinary textiles from specialized products made by people with specific skills or tools.

272. Skibo & Schiffer 2008.

### 6.2.3.3 *Production relating to society*

Olausson has pointed out that it may be possible to gain greater insight into social complexity by studying how production was organised.<sup>273</sup> Her model, developed for Neolithic Scandinavia, has previously been successfully applied on textile production by Andersson.<sup>274</sup> Regarding specialisation, Olausson recognises five levels of production. Table 6.2 shows the characteristics of the first four levels.

Household production can be present in any kind of society but if it is possible to identify the product of a specialist, this should indicate a higher level of social complexity. The products of these types of specialised production must surely have different characteristics. A craftsman, producing for his patron, will make a product that will heighten the status of this patron. His products therefore, will have to show the time and effort the craftsman has put into it. An independent craftsman would not have the time to elaborate on his work in the same way. He would have to be efficient to make his money, suggesting that his products could therefore be characterised as efficient and standardised, requiring a minimum of production time and there should be little evidence of errors.<sup>275</sup>

Following this model an assessment of the textiles is needed regarding how they were made and whether there are indications of a specific type of production or specialization as pointed out in table 6.2. This is reflected in the details of the process of textile production, from producing yarns (collecting fibres and the fineness of the spinning), through the careful weaving, to the way the cloth was sewn into a garment. It is also useful to consider whether the quality of the different steps in the process is the same or not. Has for example the same level of craftsmanship been applied at each stage of the entire process of making textiles, or has part or parts of the process been of different levels? Lastly it is important to analyse how textiles were used after production and how they were possibly valued by the person or people using

them: what were they used for, how were they sewn and how much effort was put into repairing them, until they were finally discarded? It can be argued as to whether this is part of textile production, but in trying to understand textile production, it should also be considered how a fabric was used and repaired to aid understanding of its value.

### 6.2.3.4 *Theory turned into practice*

The textiles in the dataset are analysed to ascertain the degree of specialisation in the production process. To do so, every step of the production process has been considered. Analyses of spinning, weaving and needlework have been conducted by the author. These analyses involved describing the techniques used and the quality or craftsmanship visible in the thread, weave or stitching. In the following sections 6.3 and 6.4 the variables used in measuring this quality are presented. Fibre and dye analyses of several samples were done by P. Walton Rogers, The Anglo-Saxon Laboratory. The structure of section 6.3 and 6.4 will follow the results of the analyses, resulting in paragraphs dedicated to fibre processing, spinning, dyeing, weaving, finishing processes, sewing and repairing.

## 6.3 TEXTILE PRODUCTION

### 6.3.1 Fleece processing

The end product of a woven fabric is determined from the start of the production process by selecting the proper fibres from a fleece. Analysis of the fibres in archaeological textiles provides information about the natural colour, type and fineness of the wool selected for specific types of textiles. The earlier fleece type analyses were conducted using a chronological model of fleece evolution from hairy to fine and evenly distributed fleeces.<sup>276</sup> Modern critics have argued that this approach is not useful for archaeological textiles. Ryders model does not take into account that the fleece of one single sheep varies greatly at different parts of its body. It also assumes that wool was used straight from a sheep

273. Olausson 1997.

274. Andersson 2003 & 2007.

275. Olausson 1997.

276. Ryder 1964.





Fig. 6.2 Hat found in Oostrum (objectnr. FM 35B-48). The hat was made from naturally white wool which was dyed a light red. The decorative stitching was made in a darker red yarn.

while it is more likely that it was prepared, sorted and selected to create a better yarn.<sup>277</sup> Fleece analysis therefore will not provide chronological information but it may give evidence for the preparation of the fibre before it was spun into threads.

Recently the 'fleece type' of several Dutch samples has been analysed in order to compare these textiles to those in Northern Germany,<sup>278</sup> Norway and Denmark,<sup>279</sup> and Anglo-Saxon England.<sup>280</sup> Samples of 28 early medieval textiles were selected for a quick scan of animal coat and natural pigmentation (table 6.3; analysis by P. Walton Rogers, The Anglo-Saxon Laboratory). All except two textiles proved to be made from sheep's wool. A textile from Beetgum was almost certainly made from the undercoat of goat. Only four textiles were made from white fleeces. Among these were unusual fabric-types, not

necessarily locally produced (a felt from Ferwerd and a gauze-like textile, or *Schleiergewebe*, from Leens).<sup>281</sup> The hat found at Oostrum (fig. 6.2) was also made from naturally white wool. Dark brown or black was the most common colour for twills and diamond twills. Several fabrics were woven in a colour-pattern. For these patterns threads of different colours were used, creating stripes or blocks within the fabric. To the naked eye this technique has only been observed in five textiles, but it must have been applied more frequently. Fibre analyses has pointed out that six out of 28 textiles (21%) were woven with naturally dark wool in one thread-system and originally light wool in the other thread-system.<sup>282</sup> Among these were four textiles that had not been recognised as such macroscopically.

Seventeen samples from seven different textiles were selected for further analysis of fleece type (table 6.4). Warp, weft and any sewing thread or pile yarns were treated separately. In order to identify the fleece type, 100 fibres were measured and the results plotted as a histogram. According to the range, mode, mean and degree of skew of the measurements, the samples were allocated to one of seven fleece-type categories: Hairy (H), Hairy Medium (HM), Medium (M), Generalised Medium (GM), Fine (F), Semi-Fine (SF; previously called Shortwool) and Fine/Generalised Medium (F/GM). Eleven of the samples were HM, one was GM, two M and three samples (all from the same textile, Beetgum 46-95) were goat fibre.

Only two textiles show evidence for special preparation of wool. The white wools in warp and weft of the gauze-like tabby, or *Schleiergewebe*<sup>283</sup> have been allocated to the M category because of their symmetrical spread of the fibre diameters and their means between 30 and 40 microns, although the maximum diameter for the M type should be 60 microns and both yarns include a single fibre thicker than 60 microns in diameter (table 6.4). The wool in a similar textile from Hessens in North Germany (He33a, and possibly also in He31c), was similarly difficult to categorise and it was suggested that it

277. Christiansen 2004, Rast-Eicher 2008.

278. Walton Rogers 1995.

279. Bender Jørgensen & Walton 1986; Walton 1988.

280. Walton Rogers 2007, 10-14, 62-64.

281. Ferwerd 101-703, Leens 1939-IV.13A/7.

282. Ferwerd 101-883, Teerns 16D-98/2, Wijnaldum 77A-102B, Dokkum a1913/11.223/2, Leens 1939-IV.23.

283. Leens 1939-IV.3A/7.

Site name	Object code	Pigmentation	Original fleece colour
Ferwerd	101-883	dark: mod.on all light: none	dark: mid brown light: white
Ferwerd	101-703	mostly none, occasional moderate	white
Teerns	16D-98/2	dark: mod. & dense all light: 10% dense	dark: dark brown light: pale grey/off-white
Ferwerd	101-470/3	dense on all	brown/black
Ferwerd	101-470/6	mod.& dense on all	dark brown
Oostrum	35B-147/2	mostly dense, some mod.	black
Leens	1939-IV.13A/5	mod.& dense on all	brown/black
Leens	1939-IV.13A/7	none	white
Unknown	G2008-1.8	most none, occasional mod	white
Leens	1939-IV.37/2	dark Z: mod.& dense on all lighter S: light & dense	Z = dark brown S = variable within yarn – mottled effect
Oostrum	35B-48/1	Z: 3% mod. S: 3% mod. Stch: 24% mod.	Z: white S: white Stch: fawn
Beetgum	46-95	Z&S: mod.&dense all Stch: dense&mod.	Z&S: dark brown Stch: brown/black
Aalsum	33-373	Z&S&loose S: mod.& dense in uneven proportions	uneven brown and brown/black
Leens	1939-IV.18/1	tight Z2S: mod.&dense all Soft Z & S mixed non, mod. & dense	tight Z2S: dark brown Soft Z&S: mottled white/brown/black
Westeremden	1930/2a	dark: mod.all light: light	dark: mid brown light: light brown
Westeremden	1930/4	mod-dense all	brown/black
Westeremden	1930/5a	mod-dense all	brown/black
Westeremden	1926/IX.29b	mod.all	mid brown
Kloosterwijtwerd	1910/I.195/3b	light-mod-dense	mottled brown
Sellingen/Zuidveld	Z.n.1	variable 5%-30% mod	mottled off-white
Leens	Xx	plied: none mid stch: light dark stch: mod.& dense	plied: white mid stch: fawn dark stch: dark brown
Westeremden	1921/I / 2	(a) none (b) light-mod	(a) white (b) fawn
Berg Sion	A1913/11.223 packet 1	dark: dense all light: 6% black	dark: black light: white
Berg Sion	A1913/11.223 packet 2: 'warp Z+S'	Z&S: mod all	Z&S: mid brown
Berg Sion	A1913/12.5B	warp: mod & dense all weft: 40% mod	warp: dark brown weft: mottled brown/white
Berg Sion	A1913/12.5 zn2	all three: mod & dense all	dark brown throughout
Berg Sion	A1913/11.224	light Z: none & some light dark S: mod & dense	light Z: off-white dark S: dark brown
Berg Sion	A1913/11.223D	all three: mod & dense on all	dark brown

Table 6.3 Textiles analyzed for fibre and natural pigmentation.

mod. = moderate; stch = stitching. Analysis by P. Walton Rogers, The Anglo-Saxon Laboratory.

## CLOTHES MAKE THE MAN

Sample	Structure/ Yarn	Range	Mode(s)	Mean±S.D.	Pearson Coeff. of skew, distribution	Medullas	Pigment	Fleece type
<i>Beetgum</i>								
46-95	2/2 twill: Z	12-67	16	22.9±11.1	+1.01, skewed positive	obscured (≥20%)	100% dense	Goat underwool
46-95	2/2 twill: S	11-73	16	22.5±10.4	+0.81, skewed positive	obscured (≥15%)	100% moderate & dense	Goat underwool
46-95	stitching	10-58	17	20.8±8.7	+1.05, skewed positive	obscured (≥10%)	100% moderate & dense	Goat underwool
<i>Dokkum, Berg Sion</i>								
Hat A1913/11.223D	2/2 diam: Z	16-70	27	34.3±11.0	+0.56, skewed positive	obscured (≥10%)	100% dense	Hairy Medium
Hat A1913/11.223D	2/2 diam: S	14-86	25	35.3±13.9	+0.77, skewed positive	obscured (≥5%)	100% dense	Hairy Medium
Hat A1913/11.223D	stitching	10-55	24, 25	32.5±10.8	+0.56, skewed positive	obscured (≥5%)	93% dense	Hairy Medium
A1913/11.224	fine tabby: Z	12-55, 98	24, 25	29.0±11.9	+0.90, skewed positive	3% (1 kemp)	0	Hairy Medium
A1913/11.224	fine tabby: S	15-74, 94	19	25.6±10.1	+0.72, skewed positive	obscured	100% dense	Hairy Medium
<i>Aalsum</i>								
Hat 33-373	2/2 diam: Z	12-62	20, 27	30.1±11.3	+0.65, skewed positive	obscured	100% moderate & dense	Hairy Medium
Hat 33-373	2/2 diam: S	15-80	26, 27	38.8±13.9	+0.81, skewed positive	obscured	100% moderate & dense	Hairy Medium
<i>Oostrum</i>								
35B-147/2:	2/2 diam: Z	15-68	25	32.0±11.4	+1.00, skewed positive	obscured (≥1%)	100% dense	Hairy Medium
35B-147/2:	2/2 diam: S	21-55	24	30.7±10.5	+0.43, symm/ skewed	obscured	100% dense	Generalised Medium
Hat 35B-48/1:	2/2 diam: Z	14-67, 88	20, 27	30.8±12.5	+0.82, skewed positive	1% (1 kemp)	4% moderate	Hairy Medium
Hat 35B-48/1:	2/2 diam: S	15-68	25	28.2±9.8	+0.87, skewed positive	3%	3% moderate	Hairy Medium
Hat 35B-48/1:	stitching: S-ply	16-80	27	32.1±13.4	+0.96, skewed positive	c.6%	24% moderate	Hairy Medium
<i>Leens</i>								
1939-IV.3A/7	veil-weave: Z	20-52, 75	32	36.1±9.5	+0.22, symmetrical	2%	0	Medium
1939-IV.3A/7	veil-weave: Z	17-52, 65	30	34.6±9.0	+0.03, symmetrical	1%	0	Medium

Table 6.4 Fleece types in textiles from early medieval Netherlands. Statistics for each sample are based on the measurement of the diameters of 100 fibres

Measurements in microns (1 micron = 0.001 mm. 2/2 diam = 2/2 diamond twill.

Analyses conducted by P. Walton Rogers, the Anglo-Saxon Laboratory



may represent an HM fleece from which the hairs had been stripped out. The same may be true of the Leens example (Walton Rogers unpublished). These textiles are also found in Anglo-Saxon England and in Viking Age Denmark, Britain and Ireland, and it is possible that they represent trade goods produced in a specialist workshop.<sup>284</sup>

The textile from Beetgum is made from goat fibres. The outer coat hairs are absent in this case, which may indicate that the underwool was combed directly from the animal during its spring moult.

The Dutch textiles resemble those from Northern Germany. Previous research on 27 samples from mainly seventh-ninth century sites in Northern Germany shows that the textiles were made from fleeces that are categorized as Hairy or Hairy Medium. Similar results were obtained from samples of raw wool found at the same settlements. This may indicate that the wool was processed in the settlement, making the woven textiles a local product. Many fibres were originally of a brown or mottled brown colour. White fleeces were only observed in 22% of the threads. In contrast to the Dutch textiles, all textiles were woven with wool, which was originally the same colour in both warp and weft.<sup>285</sup> Some of the same fabrics and pigmented fleece types are to be found in Anglo-Saxon England, although the English material has a larger share of white wool and a wider range of fleeces. The *terpen* evidence contrasts with the material from Norway, which shows a much more precise method of selecting and processing wool. The raw materials from the textiles from the *terpen* show a wider range of fleece types and a lack of carefully sorting which brings them closer related to the textile types excavated in southern Scandinavia that are termed ‘Hessens-Elisenhof type’, because of their structural similarity to textiles from the North German and Dutch settlements.<sup>286</sup>

Site	Single threads	Plied yarn
Beetgum	1	0
Blija	0	1
Kloosterwijtwerd	4	0
Aalsum	6	0
Dokkum	77	0
Westeremden	26	0
Ulrum	1	0
Leens	41	1
Dorestad	3	0
Oostrum	4	0
Oosterwijtwerd	1	1
Anjum	1	0
Cornjum	1	2
Middelburg	12	0
Leeuwarden	7	0
Ferwerd Burmanierp	12	0
Ferwerd Burmanierp II	1	0
Foswerd	4	0
Menaldum	0	1
Kimswerd	1	0
Rasquert	5	0
Sellingen/Zuidveld	2	0
Wijnaldum	5	0
unknown, prov. Groningen	0	1
Teerns	0	1
Hoogebeintum	5	0
Wierhuizen	1	0

Table 6.5 Textiles woven with single twisted threads or plied threads.

### 6.3.2 Spinning

To spin yarns from fibres one needs a spindle (whorl) and a distaff. Depending on the direction the spindle (whorl) rotates, the threads are twisted either clockwise or anticlockwise resulting in z- or s-spun thread. Right-handed spinners generally spin clockwise (z-spun threads), but accomplished spinners

284. Walton Rogers 2007, 68-69.

285. Walton Rogers 1995, table 3.

286. Walton 1988, 153; Bender Jørgensen 1984, 130-1, Walton Rogers unpublished.

Site	<0.5mm	0.5-0.75mm	0.75-1.5mm	>1.5mm
Beetgum	0	0	2	0
Blija	1	0	1	0
Kloosterwiltwerd	2	1	3	0
Aalsum	0	3	6	3
Dokkum	35	40	64	11
Westeremden	10	13	29	2
Ulrum	0	0	0	0
Leens	12	14	25	21
Dorestad	1	0	0	1
Oostrum	2	6	0	0
Oosterwiltwerd	0	0	2	0
Anjum	0	0	0	0
Cornjum	0	0	5	1
Middelburg	9	7	7	1
Leeuwarden	0	6	6	0
Ferwerd Burmanierp	5	11	8	0
Ferwerd Burmanierp II	2	0	0	0
Foswerd	0	1	6	1
Menaldum	0	0	2	0
Kimswerd	0	0	2	0
Rasquert	0	2	6	0
Sellingen/Zuidveld	1	1	2	0
Wijnaldum	0	1	7	2
unknown	0	2	0	0
Teerns	0	0	2	0
Hoogeteintum	3	2	3	0
Wierhuizen	0	2	0	0

Table 6.6 Thickness of spun threads per site and per group of sites.

can change the direction of spin when needed. In order to make an even stronger yarn several threads may be twisted together, resulting in plied yarn (for example a 2zS-yarn is made out of 2 z-spun threads, plied S-wise). Among the woven textiles single twisted threads are most common. Plied yarn has been used only in a few cases (table 6.5). This small share of plied yarns is a great contrast to the (Roman) Iron Age when plied threads were used in the majority of textiles.<sup>287</sup>

### 6.3.2.1 *Quality of spinning*

The quality of spinning can be ascertained by studying the thickness of the threads and the degree of regularity of the spinning. Presumably every woman in the early Middle Ages could spin with a considerable degree of skill. Recent spinning experiments have pointed out that even nowadays one can, with a little practice, easily spin quite regular thin threads of about 0.5 mm with practically any

287. Bender Jørgensen 1992, 49.

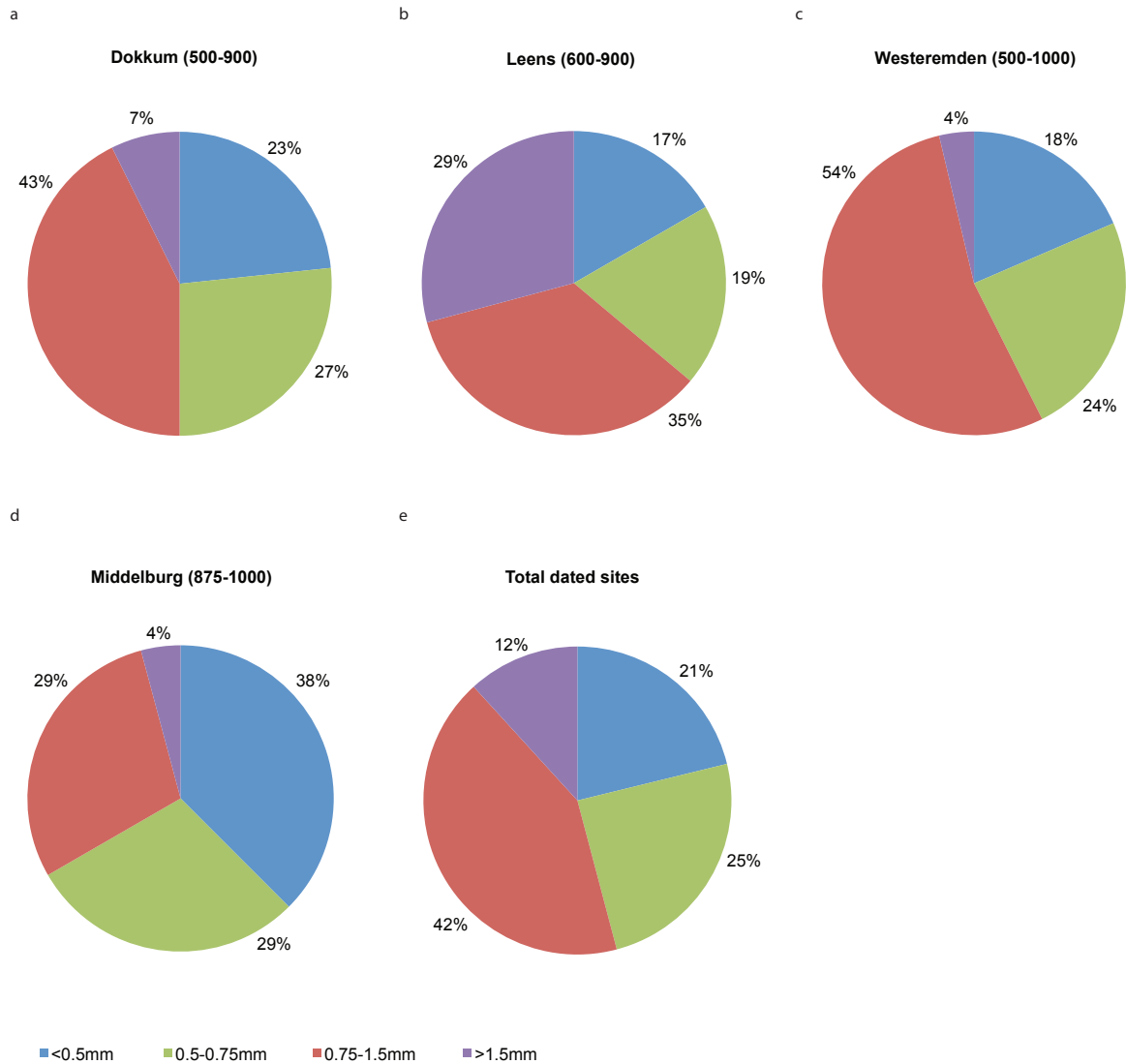


Table 6.6 Distribution of thread thickness of the major textile sites.

type or size of spindle whorl.<sup>288</sup> We should however take into account that the breeds of sheep kept in the early medieval period had fleeces that were not as ideally suitable for spinning thin yarns as those bred nowadays. Thickness of threads has therefore been divided into 4 classes: <0.5 mm, 0.5-0.75 mm, 0.75-1.5 mm and >1.5 mm. The first category consists of very fine threads that needed careful spinning, but also needed more time to be woven into fabrics.

288. Spinning experiment at the Textilforum held in September 2009 in Eindhoven, the Netherlands.

The second category 0.5-0.75 mm may be regarded as the thickness that could easily be spun by any experienced spinner. The third and fourth categories are coarser or thicker yarns.

Wild and others stressed the great advantages of digitally analysing the degree of twist in yarns, because it enabled researchers to distinguish the hand of individual spinners in a dataset and also the degree of experience of the spinner.<sup>289</sup> Unfortunately

289. Cork et al. 1996, Wild et al 1998.

this method was not available for this dataset. Therefore the degree of twist has been classified as low, medium or high or – in case of irregularly spun threads – as a combination of these. The finer threads (up to 0.5 mm) are generally spun medium to high regularity, making a very strong yarn. The 0.5-1.5 mm thick threads show a wide range of twist, from low to very high. The very thick yarns are often barely spun, making a very soft thread.

Table 6.6 shows that most fabrics at the well-dated sites were woven with threads of 0.75-1.5 mm thickness. The finest, <0.5 mm and 0.5-0.75 mm are both equally represented, while the group of >1.5 mm is represented only in small numbers. There are some differences between the three major textile sites, Dokkum, Westeremden and Leens. In Dokkum there is slightly more fine spinning, whereas Westeremden has a larger share of the 0.75-1.5 class. Leens shows significantly less fine threads and much more very coarse yarns of the >1.5 mm class. Middelburg shows a completely different pattern with a dominance of fine spinning: 37% in the <0.5 mm, and 29% in the 0.5-0.75 mm class.

As stated before we may assume that it was possible to produce threads as thin as 0.5 mm despite the lower quality of the wool. Therefore there is no doubt that it would technically be possible to spin even finer threads. But spinning and weaving these fine threads into equally fine fabrics would take much more time, as compared to coarser threads and fabrics. These textiles consequently must have been more valuable than the coarser fabrics. The fact that more than 20% of the yarns are of this fine and time-consuming quality, indicates that the people in these settlements did to some degree have the means to afford these products: either the available time to produce this quality textile, or sufficient wealth to purchase it, which may imply a certain level of craft specialization.

The majority of the spinning though is of a much coarser quality. Instead of considering the technical limitations of the craftspeople, there may be other ways to explain this distribution. One very practical assumption may be that the settlements have yielded not only remains of clothes but also a large proportion

of furniture or household textiles, which were not required to be of a very fine quality. Many pieces in the coarse section of the dataset however show traces of sewing and may have been primarily used as clothing. It may therefore be assumed that time was an important factor in the choice of a certain quality of thread as well. As stated earlier, spinning and weaving fine threads takes a considerable time. This time had to be found against competition with many other tasks. Therefore an overrepresentation of rather coarse fabrics may indicate that the people involved generally did not have the time to put more effort into textile production. Neither, it would suggest, did they have the means to let others do this work for them. Comparing the sites, Dokkum may perhaps be seen as an exception where there is an even distribution of threads up to 0.75 mm and thicker ones. Middelburg seems to be an important exception, but in reality it is not. The examples of fine spinning in the textiles from this settlement are in most cases present in the warp only. These fabrics have been made with a very thin and strong warp, but very often with a much thicker weft. The textiles thus created are no more time consuming than the other rather coarse fabrics in the dataset.

### 6.3.3 Dyeing

In early historic times many dyes were used. A red colour was obtained by dyeing the wool with dyestuff extracted from different species of dyer's madder. Archaeological evidence for the cultivation of *Rubia Tinctorum* L. in The Netherlands is not available until the 17th century. There is historical evidence that dyer's madder did occur in the terpen area in the northern part of the Netherlands in the early Middle Ages.<sup>290</sup> Wild madder (*Rubia Peregrina* L.) is known in the southern part of Great-Britain and in the Mediterranean. Dyers woodruff and bedstraw were also used to produce red colours as far back as the fifth century AD.<sup>291</sup> Red could also be obtained from the insect Kermes creating a very strong and colourfast dye. This precious dye was produced in the Mediterranean and valued greatly in north-western

290. Van Haaster 2001.

291. Cardon, 2003 120-128.

Site name	Object code	Structure	Original fleece colour	Results of dye tests
Ferwerd	101-703	felt	white	yellow stain/dye
Leens	1939-IV.13A/7	tabby	white	no dye detected
Oostrum	35B-48/1	2/2 diamond twill	Z: white S: white Stch: fawn	hat: purpurin-rich madder stch: same but much stronger
Beetgum	46-95	2/2 twill	Z&S: dark brown Stch: brown/black	brown stain/dye
Aalsum	33-373	diamond twill	uneven brown and brown/black	no dye detected
Dokkum	A1913/11.223D	2/2 diamond twill	dark brown	hat: brown tannin-based dye stch: no dye detected
Sellingen/ Zuidveld	Z.N.1	2/2 twill	mottled off-white	no dye detected
Dokkum	A1913/11.224	Tabby	light Z: off-white dark S: dark brown	no dye detected

Table 6.7 Results of dye-analyses (mod. = moderate; stch = stitching).

Europe as a symbol for kings.<sup>292</sup> Lastly shades of crimson could be obtained using a dye extracted from the insect of the *Porphyrophora* species. Evidence of this dye has been found in a sixth century context in Germany.

Blue colours were obtained from woad (*Isatis tinctoria* L.). Woad has been known in the Netherlands since the Iron Age.<sup>293</sup> Yellow dyes were extracted from weld (*Reseda luteola* L.), which was widespread in western Europe.<sup>294</sup> Remains of this plant have been found in Roman forts in the Netherlands, illustrating its presence.<sup>295</sup> Another source for yellow dyestuffs is the plant Dyer's broom, which has been identified in ninth century find from York.<sup>296</sup> Purple was obtained from lichens of the genera *Ochrolechia* and *Umbilicaria*. This dye has been identified in ninth-tenth century finds from York, Dublin, London and Scandinavia.<sup>297</sup> Purple could also be extracted from marine molluscs, which was a very expensive way of dying. In Late Roman period purple was associated with imperial majesty and in later period it remained

the colour for kings and synonymous for wealth. The prestige of the colour purple increased with its scarcity. The dyestuff was not locally available and had to be traded from the Mediterranean or Brittany (France).<sup>298</sup> Different hues of brown would have been obtained using natural dyestuffs from bark and nuts that were readily available in any wooded area.

Only the wealthy could afford to wear certain colours, for these colours were expensive to produce. To wear them was thus a social signal to the wearer's contemporaries, that they could afford this level of luxury.<sup>299</sup> Analysing textiles for dyestuffs may therefore result in an indication of the wealth of the original wearer. There are, however, a few hurdles to overcome in relation to dye analysis. Natural dyestuffs deteriorate over time and will very often have disappeared entirely during the period the textile was buried. Consequently a negative result in dye analyses does not necessarily mean that a fabric was not originally dyed. Many dyes that were locally available, like the brown colours from nuts and bark, would be hard to detect as well. It is generally very hard to discern the chemicals from these dyes from those naturally present in the soil because of

292. Ibidem, 618

293. Cappers 1994.

294. Cardon 2007, 170.

295. Pals 1997, 35.

296. Cardon 2007, 177.

297. Ibidem, 501.

298. Ibidem, 574.

299. Hedeager Krag 1993.

CLOTHES MAKE THE MAN

	Tabby		Repp-effect	2/1 twill z/s	2/2 twill		Herringbone /chevron		Lozenge twill z/s	Cross twill z/s	Diamond twill		Diamond Twill Pattern Repeat			
Site	z/z	z/s	z/s	z/s	z/z	z/s	z/z	z/s	z/s	z/s	z/z	z/s	10 /8	10 /14	10 /16	12 /10
Beetgum						1										
Blija				1												
Kloosterwijtwerd						1						3				
Aalsum					1	1						4				
Dokkum	1	5	1	4	2	29	1					33	1	1	1	
Westeremden		1				3		1				21				
Ulrum									1							
Leens	3					16					2	15				
Dorestad						1		2								
Oostrum												4				
Oosterwijtwerd	1															
Anjum						1										
Cornjum						1						2				
Middelburg										6		6				5
Leeuwarden												5				
Ferwerd Burmanierp						1						1				
Ferwerd Burmanierp II																
Foswerd				1		2										
Menaldum																
Kimswerd																
Rasquert						1		1				3				
Sellingen/Zuidveld												2				
Wijnaldum						1										
unknown, prov. Groningen						1										
Teerns						1										
Hoogebeintum						1						3				
Wierhuizen												1				
Total	5	6	1	6		62	1	4	1	6	2	103	1	1	1	5

Table 6.8 Distribution of the weave types per site.

EARLY MEDIEVAL TEXTILE REMAINS FROM SETTLEMENTS IN THE NETHERLANDS.

	Diamond Twill Pattern Repeat																	
Site	12 /18	14 /10	16 /10	16 /18	18 /24	20 /18	20 /22	22 /18	22 /24	24 /18	28 /18	20 /26	28 /26	30 /20	30 /28	32 /18	32 /30	40 /28
Beetgum																		
Blija																		
Kloosterwijtwerd	3																	
Aalsum						1				1				1	1			
Dokkum	3		1	1		1	1	1	1	1						1		1
Westeremden		1		1		10				2	2	1					1	
Ulrum																		
Leens	4			2		3											1	
Dorestad																		
Oostrum	1					1												
Oosterwijtwerd																		
Anjum																		
Cornjum												1						
Middelburg																		
Leeuwarden					1					1								
Ferwerd Burmaniaterp								1										
Ferwerd Burmaniaterp II																		
Foswerd																		
Menaldum																		
Kimswerd																		
Rasquert										2								
Sellingen/Zuidveld						2												
Wijnaldum																		
unknown, prov. Groningen																		
Teerns																		
Hoogebeintum								2										
Wierhuizen																		
Total	11	1	1	4	1	18	1	4	1	7	2	1	1	1	1	1	2	1

their similarity to material found in the natural environment. It is difficult therefore, to know exactly how colourful early medieval clothes actually were. Recently, seven textiles have been selected for dye analysis (table 6.7). The chemical signature of dye could be identified in the hat from Oostrum (fig. 6.2), which had been made from a white fleece for the main body of the hat, with decorative stitching in fawn wool. The same madder type dye was present in both the textile and the sewing thread, but it was much more concentrated in the stitching, making it likely that the ground fabric was light red, salmon or peach and the needlework a deep dull red. Chemically, the dye was dominated by purpurin, but there was a trace of alizarin, which suggests that the dye came from the roots of *Rubia tinctorum* L.<sup>300</sup> There appeared to be a tannin-based brown or black colorant in the headdress or hat from the site Berg Sion.<sup>301</sup> This is fairly exceptional, since the headdress was made out of naturally brown wool, which would in most cases not have been dyed. No dye was detected in the Leens *Schleiergewebe-tabby*. This does not mean that the textile was not dyed. Other textiles of this type have proved to be dyed black, blue or purple.<sup>302</sup>

Previous research on Anglo-Saxon textiles has pointed out that naturally white wools were often dyed. Analyses of naturally brown or black samples nearly always had a negative result, which leads to the idea that these textiles were in most cases not dyed at all. The textiles from the Netherlands and Germany<sup>303</sup> are very similar in this respect. Chemical signatures of dyes have been detected in only a few textiles. Those fabrics that had certainly been dyed come from hats that had been sewn with great care (see section 6.4.2 Needlework) and must have been valued for their appearance. The rest of the textiles were probably either originally (mottled) brown or black.

### 6.3.4 Weaving

#### 6.3.4.1 Looms and their characteristics

The process of weaving large pieces of cloth was generally conducted on a warp-weighted loom. These loom weights can be found in abundance at Dutch sites. Another type of loom known from the countries surrounding the Netherlands, is the two-beam vertical loom. From the tenth century onwards historical texts mention a third loom type: the horizontal treadle loom.<sup>304</sup> In the beginning the width of the cloths produced on this loom was not very large. When weaving cloths of more than 1 meter width one needed two weavers to operate this loom and it was only later that this became custom. Where the warp-weighted loom was very suitable for weaving broad cloths up to a length of 10 m, the horizontal loom was most effective when weaving narrow fabrics longer than 10 m.<sup>305</sup> The warp-weighted loom has no reed or batten which may have affected the regularity of the thread systems. This irregularity is visible in the woven fabric in variable spacing of the threads and curving lines.<sup>306</sup>

No research has been conducted so far into the specific weaving tools that are associated with the various loom types, therefore the distribution of weaves as presented below cannot yet be related to a type of loom.

#### 6.3.4.2 The fabrics from Dutch settlements

Before shifting focus to signs of specialization in weaving, a brief overview is required of the characteristics of the textiles from the Dutch settlements. The focus of this survey will be the different techniques observed and the distribution of these techniques, among the sites and through time. Among the well-dated sites, 50% of the textiles were woven in a diamond twill (fig. 6.3). 2/2 Plain twills are also present as a large group, followed by tabby, 2/1 twill, cross twill, herringbone or chevron twill and repp-effect tabby in small quantities. There

300. Walton Rogers unpublished.

301. Objectno. a1913/11.223D.

302. Walton Rogers 2007, 69.

303. Walton Rogers 1995.

304. Cardon 1999, 412.

305. Ibidem, 415.

306. Hammarlund e.a. 2008



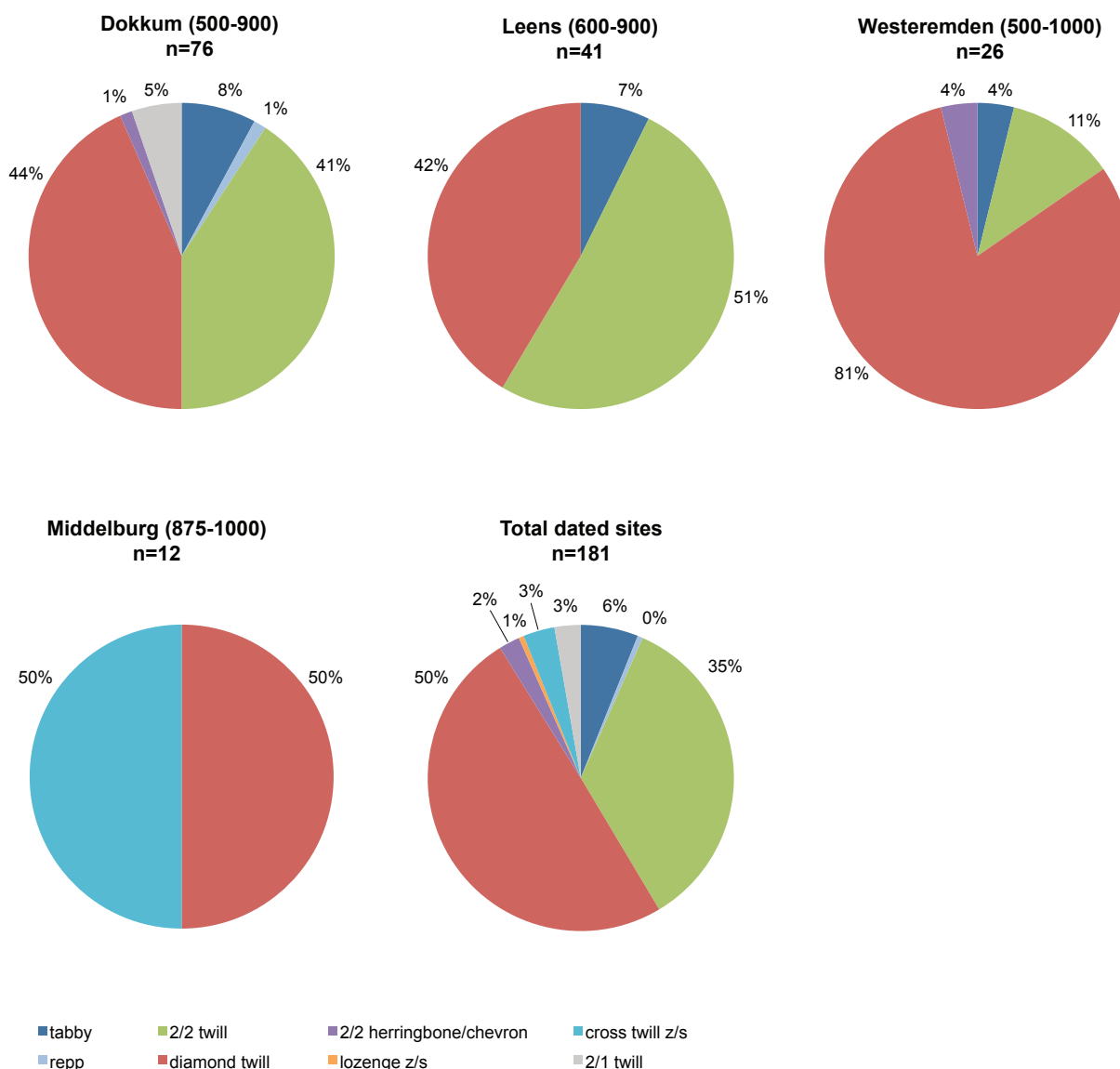


Fig. 6.3 Graphic representation of distribution of the weaves per site and per group of sites.

are considerable differences between the major textile sites of Dokkum, Leens, Westeremden and Middelburg (fig. 6.3). Dokkum shows the largest variation of weaves, which is not remarkable since this site has yielded nearly twice as many textiles as Leens and three times as many as Westeremden. Dokkum has an equal number of diamond twills and 2/2 plain twills. Westeremden gives a very different picture with a large majority of diamond twills and very few 2/2 plain twills. In contrast, Leens shows considerably more 2/2 plain twills than diamond

twills. Among the textiles from Middelburg (12 in total) we see only diamond twill and cross twill.<sup>307</sup> These different ratios among the sites may point to preferences for specific fabrics that were not necessary or required in every site to the same extent. There are considerably more 2/2 plain twills in many sites than previously documented by Bender Jørgensen.<sup>308</sup>

307. Middelburg is the only site where cross twill is observed.

308. Bender Jørgensen 1992, 48, fig. 58.

Site	Objectnr.	Type borders
Ferwerd Burmaniaterp	101-883	not reinforced
Ferwerd Burmaniaterp	101-890	tabletweave (4 tablets)
Ferwerd Burmaniaterp	101-470/6	tabletweave (6 tablets)
Hoogebeintum	28-321/3	tabletweave (4 tablets)
Wijnaldum	77A-102B	tubular selvedge
Dokkum	a1913/12.5 z.n.1	tabletweave (3 tablets)
Dokkum	a1913/12.5 z.n.2/1	tubular selvedge
Dokkum	a1913/11.226	not reinforced
Dokkum	a1913/11.236a	Starting border, not reinforced
Dokkum	a1913/11.223m/1	tubular selvedge
Dorestad	WD375.3.1	not reinforced
Kimswerd	a1913/11.233	tubular selvedge
Kloosterwijtwerd	1910/I.195/3b	tabletweave (5 tablets)
Leens	1939-IV.27/9	tabletweave (3 tablets)
Leens	1939-IV.23	tabletweave (4 tablets)
Leens	1939-IV.13/5	not reinforced
Middelburg	00049-2	not reinforced
Middelburg	00049-3, -4 & -5	not reinforced
Middelburg	00049-7 & -8	not reinforced
Sellingen/ Zuidveld	Z.n.2	tabletweave (3 tablets)
Westeremden	1921/I.76b	tubular selvedge
Westeremden	1930/I	tubular selvedge
Westeremden	1930/3a	tabletweave (3 tablets)
Westeremden	1930/8a	tubular selvedge

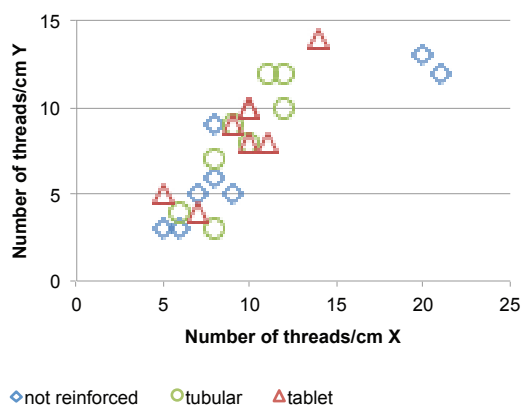


Table 6.9 The types of borders present (left) and the distribution in relation to the thread-count of the main weave (above).

Diamond twills can be woven in various patterns (table 6.8). Some sites, like Dokkum, show a considerable variation of pattern repeats. In Westeremden on the other hand, a large majority of diamond twills are woven in pattern repeat 20/18, which points to a certain preference for this pattern there. This preference is also present in settlements across the border, such as Elisenhof and Hessens.<sup>309</sup>

Several fabrics are woven in a spin-pattern. These patterns are created using both z- and s-twisted threads in warp or weft. This pattern is present in 10 textiles.<sup>310</sup> All these textiles are rather coarse, the finest being spun in 10 x 8 threads per cm, but most are below 7 threads/cm. The pattern is present in diamond twills, 2/2 and 2/1 twill and tabby.

Borders or selvages are observed in 25 textiles (table 6.9). Many of these borders are not reinforced at all, but are created by weaving the weft-thread immediately back into the fabric. This technique is, not surprisingly, mostly observed in rather coarse fabrics, but it is also present in a few of the finer textiles. Reinforced borders are present in 15 cases.

309. Tidow 1995, 359.

310. Westeremden 1930/2a, Kimswerd a1913/11.233, Leens 1939-IV.37/2 & 1939-IV.37/5, Dokkum a1913/11.223, a1913/12.5b, a1913/11.223e, a1913/11.223r, a1913/11.223y/2 & a1913/11.223ff.

These borders are made in tablet weave creating either a tablet woven band of three to six tablets or a tubular border (fig. 6.4). Hoogeteintum shows an example of a starting border in tablet weave.<sup>311</sup>

#### 6.3.4.3 Signs of specialization in weaving

There are several ways to identify possible specialization in the weaving process. One is the estimation of the time and effort spent. A common way of estimating this is by comparing the thread-counts of the weaves. Weaving a fine fabric with a large number of threads per centimetre takes more time than weaving a coarse fabric, with only a few threads per centimetre. It is therefore useful to divide the dataset into groups ranging from coarse to fine. However, a focus on thread-count alone would not do justice to many of the textiles. A cloth does not necessarily have to be of a high thread-count to be valued. A coarse but regularly spun and woven fabric may be very pretty and equally valued for its craftsmanship. So besides this quantitative approach one can consider the regularity of the weaving. Relevant variables might be whether or not faults are visible and whether the appearance of the fabric is regular or not. This is a subjective way of classifying the textiles, but nevertheless gives an impression of the skill of the weaving. Lastly, there are fabrics that needed special skills or specific tools to produce. These most likely are the products of specialized workers and must have been valuable goods.

The fabrics may be divided by thread-counts into five groups, ranging from very coarse to fine (fig. 6.5). The majority of the textiles have thread-counts below 12 threads/cm. Only a small group may be considered as fine quality, but there are no fabrics finer than 28 threads/cm. There are slight differences between the sites (fig. 6.6). Leens shows more coarse fabrics, which may point to an overrepresentation of household textiles. In Westeremden and Middelburg this coarse group is missing altogether and both sites yielded considerable quantities of finer fabrics.

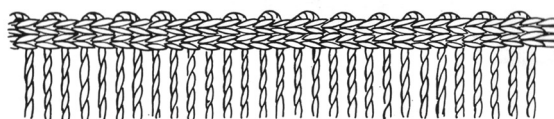
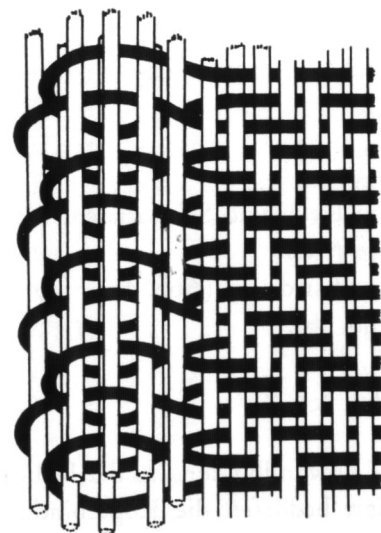


Fig. 6.4 Selvedges made in tablet weave: a tablet woven band and a tubular selvedge (after Schlabow 1976).

There are two examples of very fine spinning and weaving in the dataset. Firstly, the so-called *Schleiergewebe* or veil weave found in Leens (fig. 6.7).<sup>312</sup> This is a very fragile and open tabby, woven with z-spun threads of 0.2 mm and approximately 10 threads/cm. The fabric was woven out of naturally white wool<sup>313</sup> and was possibly used as headdress. The finest textile is another tabby (repp-effect) found in Dokkum. This fabric is a very dense cloth woven with 28 x 15 threads/cm.<sup>314</sup> Two colours of wool were used: white for the warp and dark brown for the weft. It is not clear whether the fabric was also dyed, since no dyes have been detected on the textile. Both these fabrics must have taken considerable time to produce.

312. Object no. 1939-IV.13A/7 & 1939-IV.13/1.

313. No dyes were detected during dye-analyses.

314. Objectno. a1913/11.224.

311. Objectno. 28-321/3..

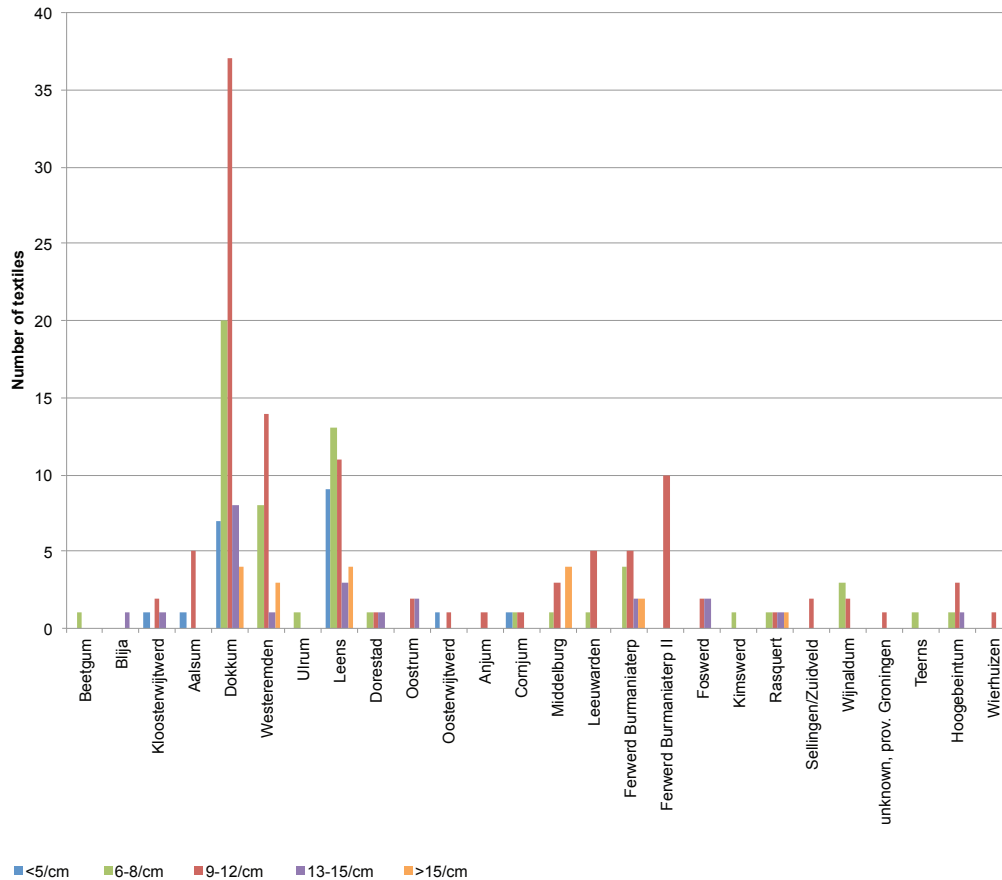


Fig. 6.5 Distribution of the different groups or qualities of weaving by site.

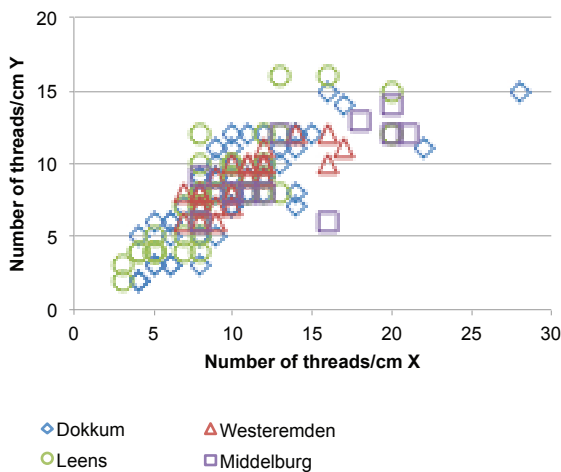


Fig. 6.6 Comparison of the quality of weaving between the sites of Dokkum, Leens, Westeremden and Middelburg.

Comparing thread-count and the regularity of the weave gives further information about the quality of the fabrics. The finer fabrics are often of a high and regular quality, as may have been expected, but this is also the case for most of the textiles in the middle group. This group, woven with approximately 10 threads per cm, was perhaps not necessarily of high value, but it may reflect the quality of work an accomplished weaver could achieve in normal circumstances. Using Olausson's model for production it may also be possible to classify these textiles as the products of an independent specialist, as they are characterised as efficient and standardised, requiring a minimum of production time and with little evidence of errors.

Another pattern emerges when the different weaves and their thread-count are compared (fig. 6.8). 2/2 twills generally are coarser than their counterparts,



Fig. 6.7 Veil-like fabric or *Schleiergewebe* found in Leens (objectnr. 1939-IV.13A/7 & 1939-IV.13/1). Photo: M. Schouten.

2/2 diamond twills. Technically, 2/2 twills are easier to weave than diamond twills and the fact that this bind is most often produced in low thread-counts affirms its function as bulk product, which generally must have been used for general household needs. Diamond twills, on the other hand, were not made in coarse fabrics. The decorative pattern of this twill, in combination with the higher thread-counts and the technical difficulty, may point to a different value and use of this cloth type.

Finally there is one type of fabric that required extra technical skill to produce, piled weave. Piled fabrics are sparsely represented in the Netherlands. Examples were found only in Leens and Dokkum (figs. 6.9 and 6.10).<sup>315</sup> These weaves are rather coarse, very thick and densely felted z/s 2/2 twills, with long strands of s-spun thread worked into the fabric and hanging from the surface. These threads had the same function as fur, causing water to drip down the threads instead of drenching the woven cloth beneath. This fabric was very suitable for cloaks, which has been confirmed by finds in England. There, this fabric has been found mainly in men's graves as a cloak or body cover. In some cases piled fabrics had been dyed<sup>316</sup> and the quality

315. Dokkum a1913/12.5 z.n.2/1, Leens 1939-IV.18/1, 1939-IV.37/2, 1939-IV.37/4b, 1939-IV.37/6.

316. Walton 1989, 336; Geijer 1938, 132.

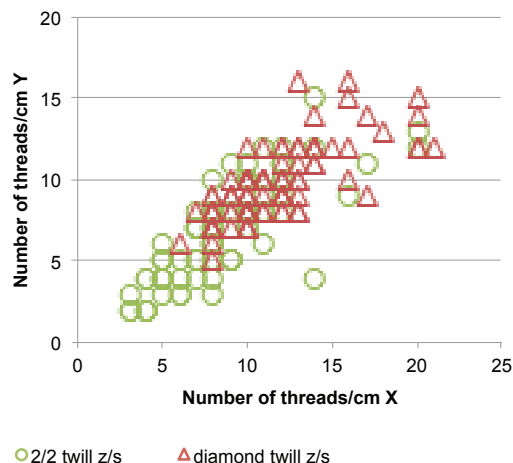


Fig. 6.8 Comparison of the quality of weaving between 2/2 plain twills and diamond twills. The diamond twills generally are woven with more threads/cm.

of the wool suggests that they were luxury goods.<sup>317</sup> The production site of piled fabrics in fifth-seventh century (presumably contemporary to the Dokkum textile) is unclear. From the eighth century onward (contemporary to Leens) piled fabrics were traded from Ireland and Iceland, but the Frisians seem to have had a share in this trade as well. Texts mention that they were trading in a cloth called *villosa* that may have been used for this type of cloak.<sup>318</sup>

In summary, it is possible to conclude that the coarser weaves were generally made in z/s 2/2 plain twills. These twills were quick and easy to make and were used for household needs, bedding, sacks, etc. The largest group of textiles consists of regularly woven 2/2 twills or diamond twills that could have been produced by any able weaver, so presumably production took place on a domestic level. Applying Olausson's model, the regularity and efficient production of these textiles may however also be interpreted as characteristic for the work of independent specialists. Only a small group of mainly z/s diamond twills are of a finer quality, which took more time to weave. It is not clear whether this production took place at the household level or at a specialist workshop. One can merely conclude that people did occasionally take the time to make these

317. Walton Rogers 2007, 85.

318. Ibidem, 85-86.





Fig. 6.9 Piled weaves found in Leens (above, objectnr. 1939-IV.18/1) and Dokkum (below, objectnr. a1913/12.5 z.n.2/1). Photo: M. Schouten.

textiles or pay somebody else to spend their time in weaving the cloth. The veil weave found in Leens and the two piled weaves from Leens and Dokkum are rare examples of textiles that were almost certainly objects of trade.

### 6.3.5 Felting

Felting is a process that takes place after weaving a fabric. It involves soaking the woven fabric in water and a fulling substance like soap or mud, and then beating or treading it. The aim of this process is to make the fabric thicker, more dense and therefore warmer and waterproof. It is, however, not so easy to recognise whether or not a fabric has been felted

deliberately, because a garment can get the same matted and felted surface when it is used in normal life through the friction of one piece of cloth onto another. On the other hand, the absence of a felted surface does not necessarily mean that a fabric was not felted. The matted surface can easily break away during excavation and finds processing, leaving a clean and unfelted appearance.

There are only a few textiles that show a felted surface. Several of these seem to have been primarily felted. The piled weaves, which had probably been used as cloaks, must have been felted. These thick and dense fabrics were clearly meant to be waterproof and a felted fabric would greatly enhance the function of this garment. The mitten found in Dorestad (fig. 6.15), a thick mantle-like fabric from Dokkum and two pieces from Middelburg are also likely to have been felted.<sup>319</sup> In the case of the Middelburg textiles, it has been suggested that they have a raised nap.<sup>320</sup> The technique of raising a nap involved roughening up the surface of the fabric with teasels and afterwards shearing the surface back with large iron shears. This technique had been in use since the Roman period,<sup>321</sup> and is considered a specialist activity in the early Middle Ages.

## 6.4 FUNCTION AND USE OF TEXTILES

The way in which the textiles were used may reflect how they were valued. Using a textile involves first sewing it into shape for its primary use, then wear and repair, eventually followed by secondary use, until it was finally discarded as waste. It would be expected that a valuable textile had been sewn with great care and, if necessary, repaired with equal care to maintain its function as long as possible. It is often difficult to ascertain the primary function of the textiles involved, because of their fragmentary state. Nevertheless, a few semi-complete garments are present and a very large number of pieces with seams, hems and other stitching, making it possible to consider the overall quality of the needlework.

319. Dorestad WD375.3.1, Dokkum a1913/11.226, Middelburg 00049-9, -11.

320. Leene 1964.

321. Wild 1970.

#### 6.4.1 The function of the textiles

Several pieces of garments could be recognized, among which were hats, mittens and parts of sleeves. Gussets were also present, indicating the presence of tunic-like garments. These garments must be considered in detail, because they illustrate a broad variety of sewing techniques and may relate to the function of the textiles.

Six hats are known from early medieval settlements. These hats are all woven in diamond twills in a range of qualities.

The hat from Aalsum<sup>322</sup> (fig. 6.11) is made out of scraps of four different fabrics, with a thread-count of approximately 10 x 8 threads/cm. It is sewn roughly with whipstitches (fig. 6.20 1a) and running stitches (fig. 6.20 6c), using 1-2 mm thick plied sewing thread. The hem at the back has been edged with blanket stitches (fig. 6.20 4a), while the hem at the front was folded back and attached with small whipstitches. The hat has undergone high quality repairs, using small (5 mm) stitches and thin (0.7 mm) red thread.

The settlement at Leens has yielded two hats. Well known is the hat illustrated in figure 6.12.<sup>323</sup> This hat was constructed with three pieces of different fabrics, with thread-counts ranging from 8 x 7 to 12 x 9. The crown is attached to the sides with 5 mm wide (whip) stitches. Seam allowances are secured on the inside with 5 mm wide stitches. The hem is folded twice and coarsely secured with whipstitches, more than 1 cm apart. The thread that has been used is a double z-twisted thread.<sup>324</sup>

Another hat is present in the collection of the National Museum of Antiquities (fig. 7.1).<sup>325</sup> This so-called pillbox-cap bears great resemblance to

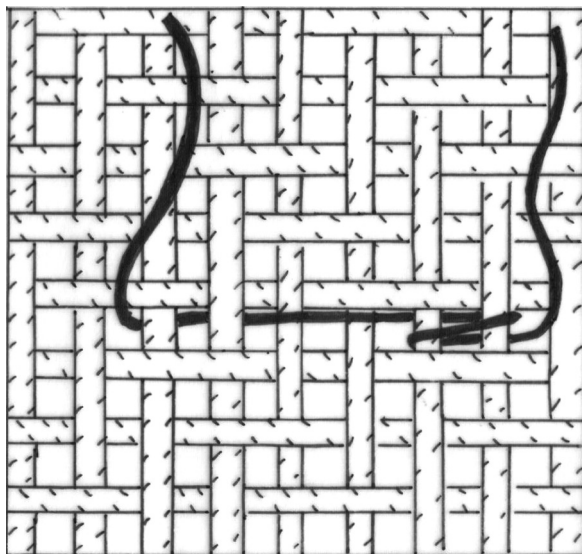


Fig. 6.10 Piled weave of Dokkum. The pile has been partially woven into the fabric.



Fig. 6.11 Hat found in Aalsum (objectnr. FM 33-373).

322. Objectno. 33-373. The hat from Aalsum is dated between 700-900 AD. It must be stressed however that this date may not be correct since it is not based on radiocarbon but on associated finds.

323. Objectno. GM1939/IV:13/1. This hat is dated between 700-1000 AD.

324. Zimmerman, 2009.

325. Objectno. b1930/12.34/1.





Fig 6.12 Hat found in Leens (objectnr. GM1939/IV:13/1). Photo: J. Stoel, courtesy of the Groninger Museum.

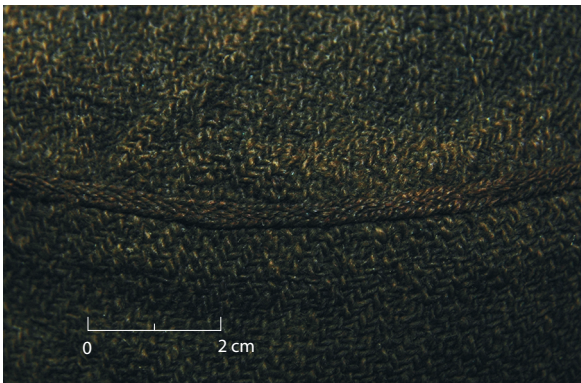


Fig. 6.13 Decorative stitch applied at the hat of Oostrum, Leens and Dokkum.



Fig. 6.14 Cap found in Rasquert (objectnr. GM1928/VIII:1). Photo: M. de Leeuw, courtesy of the Groninger Museum.

examples from the 12th-15th century found in Greenland.<sup>326</sup> The hat was constructed from several pieces of the same diamond twill (thread-count 13 x 12), woven with fine threads, but with many faults in the diamond pattern. It seems that the edges of the different parts of the hat were firstly folded double and secured with blanket stitches to prevent fraying. Subsequently, the parts were sewn together, using a decorative stitch (fig. 6.21a). The hem of the hat is decoratively stitched through with a row of running stitches. The hat is damaged but shows no trace of repair.<sup>327</sup>

The hat from Oostrum was made out of what was originally white wool, which was dyed to a pale red shade (fig. 6.2).<sup>328</sup> The fabric is of good quality (0.5-0.7 mm threads, 14 x 12 threads/cm) and the hat was sewn with great care, using the same decorative stitch as the pillbox-cap from Leens (fig. 6.13 and 6.21a). This decorative stitch was probably of a deeper red colour, making it a contrasting and attractive decoration. The hem of the hat was secured with very small running stitches that were hardly visible from the outside. The hat was heavily used and repaired in many places. These repairs seem to be the result of one action because the same technique and same type of thread were used for all the repairs. The repairs are firm, but rough, although the repairer tried to use fabric of equal quality to the original to patch up the hat.

The cap from Rasquert (fig. 6.14) is made out of a fine diamond twill (17 x 9 threads/cm).<sup>329</sup> The crown and peak are attached with decorative stitches in s-twisted red yarn (fig. 6.21d). The seam was sewn with simple whipstitches and a decorative effect was obtained by drawing two threads through these whipstitches.<sup>330</sup>

326. Østergård 2004, 219-220.

327. Brandenburgh 2012c.

328. Objectno. 35B-48 from Oostrum is dated between 700-900 AD. It must be stressed however that this date may not be correct since it is not based on radiocarbon but on associated finds.

329. Objectno. GM1928/VIII:1.

330. Zimmerman 2009.





Fig. 6.15 Mitten found in Dorestand (objectnr. WD375.3.1). Photo: National Museum of Antiquities, Leiden, Netherlands.



Fig. 6.16 Mitten from Aalsum (objectnr. FM 33-374). Photo: National Museum of Antiquities, Leiden, Netherlands.



0 16 cm

Fig. 6.17 Fragment of a sleeve found in Middelburg (objectnr. 00049-1). Photo: H. Hendrikse.



0 16 cm

Fig. 6.19 Remnants of a garment including a gusset, sewn together found in Middelburg (objectnr. 00049-2). Photo: H. Hendrikse.



0 16 cm

Fig. 6.18 Remnant of a sleeve found in Middelburg (objectnr. 00049-2). Photo: H. Hendrikse.

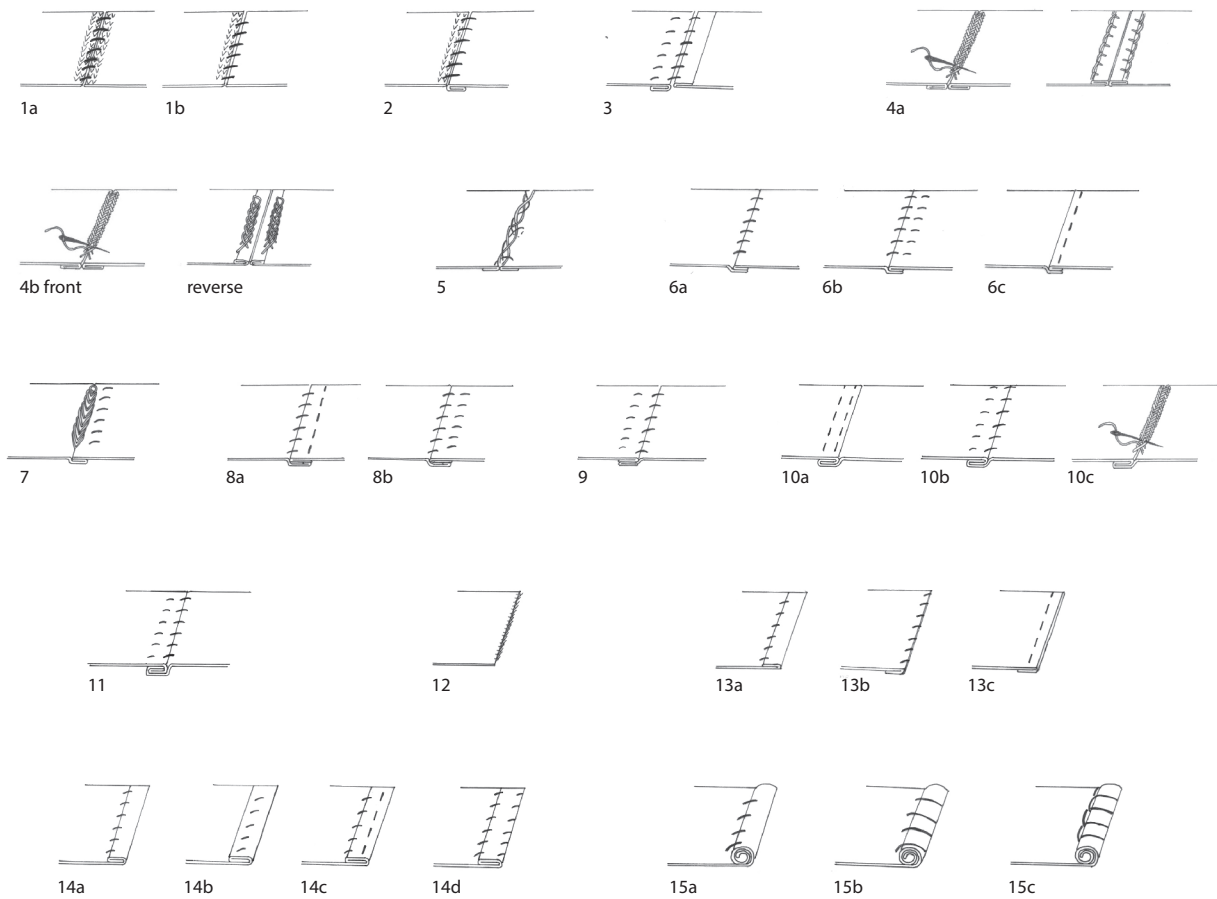


Fig. 6.20 Types of seams and hems present among the textiles from the settlements.

The headdress from Dokkum (fig. 7.4) is made out of a rectangular piece of cloth, with two side panels, woven in a diamond twill (14 x 11 threads/cm). The sewing has been carried out with great care. Seam allowances were first secured with either blanket stitches or raised chain stitches. The seams were afterwards sewn, using the same decorative stitch as in the hats from Leens and Oostrum. Dye analyses has pointed out that the headdress was dyed a deep brown, whereas the sewing-thread was probably not dyed. This decorative band would have contrasted with the fabric, like in the Oostrum hat described above.

Mittens are present in two sites, Dorestad and Aalsum (figs. 6.15 and 6.16).<sup>331</sup> In both cases coarse, thick fabrics have been used, made of thin warp thick weft threads, woven with only a few threads per centimetre. The Dorestad mitten seems to have been primarily felted, which would have greatly enhanced its practicality. Both mittens were sewn very roughly with threads up to 2 mm in width.

331. Objectno. WD375.3.1 (Dorestad) and 33-374 (Aalsum). The mitten of Aalsum is dated between 700/900 AD. This date is based on associated finds.

Three pieces of fabric have been sewn into a tubular shape, presumably a sleeve of a tunic or similar garment.<sup>332</sup> A sleeve from Leens is woven in a plain 2/2 twill with 8 x 5 threads/cm. The narrow part of the sleeve has a diameter of 24 cm with a length of 21 cm remaining. The hem and seam are sewn with 1.5 mm thick plied yarn.<sup>333</sup> Two parts of sleeves were found in Middelburg (fig. 6.17 & 6.18). One is woven in diamond twill with 12 x 12 threads/cm. The diameter at the hem is 22 cm with a remaining length of 35 cm. The sewing uses irregular whipstitches, and single and plied yarn. Another garment fragment consists of a sleeve and two side-panels with a gusset sewn between (fig. 6.19). This garment was made out of a fine diamond twill with 21 x 12 threads/cm. The remaining length of the sleeve is 20 cm with a diameter of 26 cm. The sewing was conducted with fine running stitches using plied yarn.<sup>334</sup>

Among the many textiles found in Dokkum one more is worth discussing. A large fragment 55 cm in length, consists of two rectangular pieces with a gusset (27 cm length) sewn between them.<sup>335</sup> Again the fabric is a diamond twill of approximately 12 x 12 threads/cm. Both rectangular pieces have selvages, making a strong seam at the side of the body, where the gusset is sewn in. The sewing is done using small stitches with a rather thin thread. Considerable wear and tear had occurred, making it necessary to repair the garment just above the gusset. Along the bottom of the garment the hem is present.

Some fabrics were certainly not used for clothing. Two examples have been found in association with feathers.<sup>336</sup> These textiles were probably used as mattresses or cushions. They were made in a plain 2/2 twill with 5-7 threads/cm. One fragment was woven with z-spun threads in both warp and weft, the other in spin pattern. In addition to these two pieces many more textiles presumably served as household-textiles at a certain moment in its life cycle: soft-finishings like curtains, wall hangings, coverlets and cushions were present in every house. Other textiles

may have functioned as sail cloth. In Scandinavia, and probably in The Netherlands as well, sailcloth was produced in large quantities. It was an important part of textile production and sailcloth was used as a form of currency and means of taxation. Archaeological evidence of woollen sail cloth has pointed out that in later times they were made in a 2/1 twill with 8-9 highly twisted z-spun warp yarns and 4-6 low twisted s-spun weft yarns per cm. The thus achieved fabric was impregnated with a resinous material making it stiff and reducing airflow.<sup>337</sup> Fabrics of similar thread counts, thin warp threads and thick weft threads are present in the Dutch textile record. Being rather coarse to be used as clothing material, they might have been used as sail cloths.

#### 6.4.2 Needlework

126 Fragments have remains of hems, seams or other types of stitching. This makes it possible to identify a number of different seam and hem types (fig. 20 and appendix V) and ascertain the general quality of sewing in the dataset.

A study of the complete garments makes it possible to discern the order in which sewing was carried out. Among the hats, the edges of the different pieces were secured first, to prevent further fraying and that these pieces were next sewn together. Most seams and hems show rather coarse sewing. The most popular stitch used by far is the whipstitch, which was often applied in big stitches, more than 1 cm apart. Often sewing occurred using a 2zS plied yarn of 1 to 2 mm thickness or double threads, creating a strong join. Some of the textiles show more subtle needlework, as described above. In those cases thin sewing threads were used, as well as smaller stitches. Several decorative stitches have been observed (fig. 21). An example of a heavy chain stitch (fig. 21b) was present on a fine diamond twill from Leens (20 x 15 threads/cm).<sup>338</sup> Two fabrics showed lines of running stitches that seem to have been decorative as well as functional.<sup>339</sup>

332. Leens 1939-IV.27/3, Middelburg 00049-1 and 00049-2.

333. Schlabow 1976

334. Leene 1964.

335. Objectno. a1913/11.223m.

336. Leens 1939-IV.37/2 & 1939-IV.27/9.

337. Cooke e.a. 2002.

338. Leens 1927/VI.2/1.

339. Leens objectno xx and G2008-1.8 (from an unknown site from Groningen).

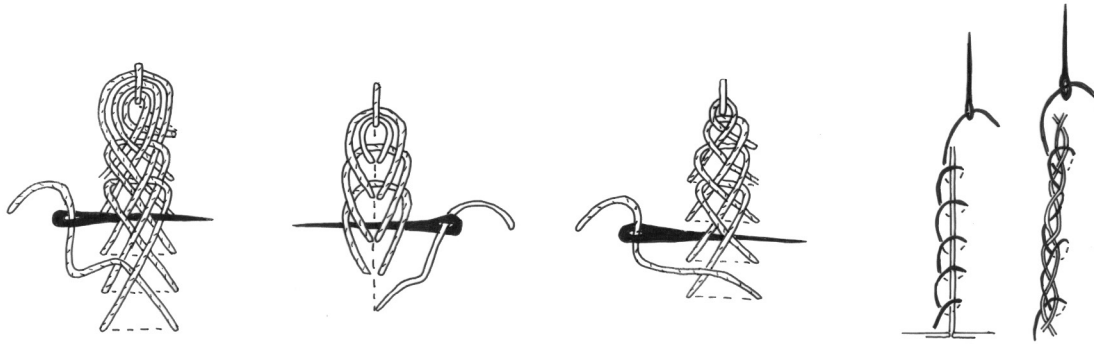


Fig. 6.21 Decorative stitches.

- A. Raised plait stitch present on the hat from Oostrum, the pillbox-cap from Leens and the headdress from Dokkum.  
 B. Heavy chain stitch, present on a textile from Leens (objectnr. GM1927/VI.2/1).  
 C. Plait stitch used to secure the seam-allowance on the inside of the headdress from Dokkum.  
 D. Decorative stitch present on the cap from Rasquert (after Zimmerman 2009).

The hats from Oostrum and Leens, as well as the headdress and garment from Dokkum and the garment from Middelburg, were especially carefully sewn. Both the inside and outside of the hats were sewn using decorative stitches (fig. 21c). Moreover, the use of the same type of decorative stitching (fig. 21a) at the outside of the hats in a contrasting coloured yarn, gives the impression of standardisation in making these hats. Somewhat simpler versions of this stitch have also been observed on a pillow cover from the ship burial of Sutton Hoo (Mound 1) in Suffolk, in York and presumably also on a cushion from the tenth century princely burial at Mammen in Denmark.<sup>340</sup> All these embroidered textiles may be considered as being of Anglo-Saxon origin.<sup>341</sup> The use of decorative stitching is self-evidently more than simply functional and may have been an indicator of wealth or status. The Dutch garments sewn using this technique were clearly of a superior status, as opposed to the majority of the textiles and were therefore probably valued for their colour, decoration and craftsmanship.

Wear and repair is a common aspect of the textiles from the settlements, which indicates that textiles in general (not only the fine textiles) were considered valuable objects. Pieces have been added onto the original fabric in 65 cases. Textiles were used, repaired and reused for different purposes until they were completely worn out. Often only a seam or a worn out and patched area remains, suggesting that the remaining pieces of the garment were cut off and reused. Repairs were in most cases sewn firmly, but often very roughly, leaving frayed edges visible. There seems to be no relation between the quality of the fabric and the way repairs were carried out. The hat from Aalsum, in contrast, which is probably the coarsest woven and sewn hat, was repaired in a very careful manner using small stitches and (probably) red sewing-thread. This may indicate that the wearers of the garments were possibly not the same persons as the people making them.

340. Crowfoot 1983; Walton Rogers 2007, 101; Coatsworth 2005, 6.

341. Coatsworth 2005, 24.



## 6.5 CRAFT SPECIALISATION IN TEXTILES

The textiles found in settlements from the Netherlands are in only a few cases made using special skills, tools or requiring much time. It has been possible to distinguish the general way in which the textiles were produced and used in these settlements by analysing the different steps in the production process. Fibres were, in most cases, selected for spinning without careful sorting. The resulting yarns and fabrics were often coarser than expected, although a considerable regularity of spinning and weaving was observed as well. This distribution may be caused by an overrepresentation of household textiles, but it may also reflect the time available for making the textiles. These fabrics are likely to have been produced at a household level, where the producer did not have time to take considerable care, often resulting in a rather coarse product.

The examples of fine craftsmanship indicate that not all textile production took place at this level. Considerable quantities of fine spinning, weaving, and needlework have been observed, indicating that the higher quality work did not often end up as refuse in the settlements, but may very well be present in larger numbers in the cemeteries. These products, like the finer fabrics, the fine needlework on the hats, the fabrics with a raised nap from Middelburg, as well as the veil-like garment and piled weaves may be considered as the work of textile specialists. Having recognized a certain degree of specialisation in the production of the textiles, the following step is to look into the way this specialised production functioned within society. Applying Olausson's model for craft specialisation it may be possible to differentiate between these specialists. During the early Middle Ages the tethered and workshop types (types 3 and 4) are most likely to be represented. Unfortunately, there is only a small dataset of specialized products to deal with and these finds have characteristics of either levels of specialisation. The veil-like tabby from Leens can be assigned to both types, whereas the hats clearly show craftsmanship (type 3), but also standardisation (type 4) and (in a few cases) errors. The fact that these products are not only found in the Netherlands, but also in other

countries, suggests either a large area of production or a considerable network of trade, which points to production organised in workshops rather than at a patron related level. The regularly woven, but rather coarse twills found in abundance in the settlements may be interpreted as household production, but they also show the efficient and standardized production characteristic of workshop industry.

The research problems described in the introduction of this chapter need further elaboration. More research needs to be conducted into the means and social organisation of textile production in the Netherlands: textile tools, raw materials and their distribution in and between a number of settlements. Furthermore, an analysis of several well-documented cemeteries should be conducted, addressing questions relating to the chronological development of textiles and their use as clothing among different groups in early medieval society.

