

Appendix 2: The DRA Textile Products End-Use Consumption Forecasting System

Introduction

This Appendix sets out the components and workings of the unique system for describing and forecasting world end-use markets for textile products which has been developed by David Rigby Associates (DRA). The technical textiles partition of this system forms the basis of the projected global volumes, values and trends presented in the DRA report "Technical Textiles and Industrial Nonwovens: World Market Forecasts to 2010" and the subsequent more detailed reports on specific aspects of the technical textiles market.

The Forecasting System

The DRA Textile Products End-Use Consumption Forecasting System describes and forecasts world end-use markets for individual textile products. It also calculates the associated volumes and values of their polymer, fibre, yarn and fabric components, and other input requirements such as machine time and chemicals. Briefly the system comprises:

- A set of "Essays" describing the important factors determining the current state of the market and the way it will evolve.
- A unique product/market segmentation method, the DRA "Fabric Story Approach", which analyses textile and clothing markets into a number of (fabric) x (end-use product) combinations.
- A database containing quantitative information on each separate product defined by the segmentation scheme, by country, with each product's make up analysed in terms of fibre/polymer type, yarn type and fabric type.
- A database of forecasts for market drivers (e.g. GDP/head, agricultural production) by country.
- The "All Fibre, All End-Uses Model" (the Model) which uses the numbers in the databases to produce tables describing the current market and to produce forecasts for a range of future scenarios defined by combining "what if" assumptions on factors such as: new technologies, end-uses and products; market drivers; relative fibre prices and any other factors influencing total volumes and inter-fibre and inter-fabric competition.

The system brings together DRA's detailed knowledge of textile markets, products, technologies, supply chains, inter-fibre competition, etc, gained from 25 years of consulting work in the world textile industry and its markets. Knowledge gaps have been filled by targeted research and any reliable published data on world markets have been incorporated.

The Technical Textiles Partition of the Consumption Forecasting System

Despite its increasing importance, the world technical textiles market has historically been very poorly documented. Basic problems exist even in defining the overall scope of the sector, in terms of which end-uses to include (e.g. sacking, soft luggage), which

fibres (e.g. glass, jute), and which product types (e.g. composites, wet-laid nonwovens). Problems also exist in terms of defining end products such as geotextiles and agricultural textiles clearly and consistently, especially between different countries. Finally, the multiplicity of products and end-uses has resulted in most of the few, regional analyses of the technical textiles market being based on estimates of production of broad product groups such as “coated fabrics” or “netting” with little detail on specific end-uses.

Forecasts on this basis are normally no more than short-term extrapolations of production trends, rather than demand based assessments of future consumption levels. Furthermore, those end-use sector studies that do exist cannot easily be added together to provide an overview of the market as a whole due to only partial coverage, overlapping or unclear definitions, inconsistent demand assumptions, etc.

The technical textiles partition of the DRA End-Use Textile Products Consumption Forecasting System aims to provide an analysis of the end-use consumption of technical textiles and industrial nonwovens which is internally consistent and comprehensive in terms of both geography and product coverage. This analysis is performed at two levels.

First, the system provides a comprehensive and detailed description of current technical textile markets, by country, in terms of volumes and values for around 150 individual end-use products, each analysed according to a wide variety of parameters as detailed below (e.g. types of fibres, yarns, fabrics, etc).

Second, it enables annual forecasts for future technical textile product market sizes to be made, together with the volume implications for each of the products’ components, inputs, etc. These forecasts can be made using any preferred set of assumptions relating both to the relevant market driver (e.g. economic growth, agricultural production, etc) and to relative fibre prices, future technology developments, etc, and their impact on volumes, fibre and fabric shares, etc.

Detailed Methodology

The methodology adopted for describing and forecasting technical textile markets within the workings of the DRA forecasting system is as follows.

- i) Identify individual products, or small groupings of similar products, which together describe the technical textiles sector. The number and definitions of these products were chosen to give as wide and representative a coverage of technical textile end-uses as possible for a reasonably manageable number of categories. The product groupings were also chosen to be as compatible as possible with market estimates available from a wide range of established sources, although such statistics proved to be very limited in number as well as in reliability and clarity of definition.

In total, around 150 individual products or groups of products were identified.

To facilitate an analysis of the technical textiles market in line with the now widely recognised market split developed by Messe Frankfurt, the organisers of the Techtextil shows, these 150 products were grouped into 12 broad application areas – e.g. Agrotech, Medtech, Oekotech). Other groupings are possible, as required.

Exhibit A2.1 provides a full list of individual products and their allocation by application area.

- ii) Draw up a full list of parameters to be used to describe each product across each of 210 individual country markets, i.e:
 - Polymer/fibre types (19 – e.g. polyester)

- Polymer/fibre (or yarn) forms (8 – e.g. high tenacity multi-filament yarn)
- Fabrics and other final textile product types (19 – e.g. weft knits)
- Coating types (5 – e.g. PVC coated)

A full list of these parameters is given in Exhibit A2.2.

- iii) For each product, collect and validate all available production, trade and consumption data back to 1995 (or earlier where possible), from secondary sources such as man-made fibre agencies (e.g. JCFA), trade associations (e.g. EDANA) and statistical bodies (e.g. Eurostat). These data encompassed not only overall volumes and values, but also, where available, product detail such as fibres and yarn types used, precise fabric type (e.g. narrow woven, warp knit, wet-laid nonwoven) and coatings used. Considerable time and resources have been spent identifying and acquiring all relevant sources of statistics and other market information to complement DRA's already extensive database and industry/market knowledge. Numerous interviews with producers and end-users were also undertaken to improve understanding of products and trends and to clarify areas of uncertainty.
- iv) Identify appropriate economic, demographic and industry 'drivers' or indicators of overall end-use consumption for each product, for example:
- Agricultural production (for land-based Agrotech products)
 - Fishing catch (fishing nets, lines, ropes)
 - Carpet production (carpet backing, ground yarns)
 - Apparel production (interlinings, sewing thread)
 - Shoe production (shoe components)
 - Automotive production (trim, seat belts, air bags, etc)
 - Tyre production (tyre cord)
 - Cigarette production (cigarette filters).

Gross Domestic Product (GDP), particularly in Purchase Power Parity (PPP) terms, either in total or on a per capita basis, is an important general driver of demand where more specific data is not available, especially for consumer-type products such as those found in the Sporttech and Medtech areas.

- v) Establish from published sources historical driver data for each region with as many individual countries as possible identified separately.
- vi) Derive best fit relationships between apparent end-use consumption and these drivers using all available national and regional data. In some cases, the calculated ratios between driver and consumption are virtually constant over time and between countries – e.g. the amount of filter tow per cigarette, quantity of sewing thread per garment, etc. In others the ratios show distinct variations both over time and between different regions – e.g. the amount of tyre cord per tyre, number of airbags per car. In those cases where consumption is GDP-related, for example medical goods, textile packaging, protective clothing, etc, demand often describes a so-called "logistics" curve, whereby consumption initially rises slowly at low levels of GDP/head, accelerating as real incomes grow, before flattening off at higher levels of per capita GDP or income.
- vii) Apply the established driver/consumption ratios for known countries to the base year (2000) and to all past years for all other countries/regions for which textile end-use data is not available in order to calculate total apparent consumption by product, correcting for different levels of technology and

market penetration in each case. Such corrections often have to be based on experience and intuition. Factors taken into account include similarities in regional and development status, as well as any other special factors which can be identified based on local social/industrial practices. Subject to such special considerations, the assumption is generally made that all comparable geographical groupings will eventually achieve similar consumption/driver ratios but over different timescales, depending on the rate of market development.

- viii) Use DRA's knowledge of process technologies and inter-fibre competition by product, to determine estimated global technical textiles consumption by polymer/fibre type, polymer/fibre form and final fabric type in 2000.
- ix) Compare estimates for fibre usage with published estimates of global fibre availability for 2000, allowing for DRA estimates on fibre usage in non-technical applications (apparel, household, carpets, etc). Adjust either total market estimates and/or fibre splits, and iterate where necessary.
- x) Develop a set of consistent forecasts for each of the selected drivers to 2010, using third party sources wherever necessary. In the case of drivers for products such as components for footwear, clothing and furniture, it was necessary first to make forecasts for global final demand for the finished products (as opposed to demand for the textile components). These forecasts were based on equations where consumption per head, again, grew more slowly than real per capita incomes (in line with historical experience).
- xi) Re-apply the established driver/consumption ratios to future years by country or region to calculate forecasts for total apparent consumption by product, again making suitable corrections for expected differences in technology and market penetration.
- xii) Extrapolate past trends in fabric, yarn and fibre shares by product by region to forecast consumption volumes by fibre, yarn and fabric type (assuming no change in relative fibre prices)
- xiii) Re-combine all individual product estimates to calculate total consumption by country and target year.
- xiv) Compare consumption totals with available data on production and demand at national and regional levels and use to adjust earlier assumptions and estimates iteratively for improved fit.
- xv) Establish unit values by fibre and final product as at Quarter 2, 2002, and apply to volumes as appropriate to calculate consumption in value terms.

Further Enhancements to the DRA Forecasting System

DRA is developing and refining further both the databases and the All Fibre All End-Uses Model to produce more accurate and more detailed forecasts for technical textiles, over future years, adding, for example, variables such as yarn titre, texturising, twist level, lamination, etc. DRA would be pleased to receive any other suggestions on how the usefulness of the current Model might best be enhanced further.

DRA is also enhancing the quality of its database for non-technical products to enable global analyses of non-technical textile markets (apparel, household textiles, home furnishings, and carpets) to be produced by end-use products and components in the near future.

Exhibit A2.1

Products included in the Technical Textiles Partition of DRA's Textile Products End-Use Consumption Forecasting System

Application Areas	Products Included
Agrotech	Woven and nonwoven crop covers, land netting, capillary matting
	Fishing ropes, fishing line, fishing nets
	Baler twine
Buildtech	Tarpaulins, hoardings, scaffolding nets
	Textile structures, awnings
	Roof scrims, Housewrap, shingles, roofing felts, sewer linings, woven roofing fabrics Concrete reinforcement, composites
Clothtech	Shoe laces, shoe components
	Woven and nonwoven interlinings, waddings
	Sewing threads, labels, fasteners (zips, Velcro)
Geotech	Ground stabilisation geotextiles
	Soil reinforcement geotextiles
	Erosion control geotextiles
	Pit linings
Homotech	Woven carpet backings, nonwoven carpet backings, carpet ground yarns
	Spring wrap, insulators, fibrefill, webbings, mattress components, curtain tapes, platform cloths, dust cloths, nonwoven furniture components, thread
	Woven and nonwoven wipes, nonwoven vacuum filters, HVAC filters
	Mattress tickings, pillow tickings
	Composites
Indutech	Filters: air, nonwoven dust, nonwoven liquid, other nonwoven, other woven, cigarette; papermaking felts
	Conveyor belt, hoses, drive belting
	Abrasives, brushes, woven wipes, nonwoven wipes
	Lifting webs, ropes
	Cable components, electrical composites, battery separators, etc Seals/gaskets, misc. coated fabrics, fibrefill, other composites
Medtech	Wipes, cotton wool
	Coverstock
	Woven, knit, nonwoven woundcare, sterile packaging
	Woven and nonwoven gowns/drapes, medical mattresses
Mobiltech	Car, CV tyre cord, hose, belts
	Seat belts, air bags
	Upholstery, woven and nonwoven trim, insulation
	Tufted, needled carpets, backing
	Truck covers, tie downs
	Transport composites, marine composites Cabin filters, ropes
Packtech	FIBCs, sacks, laundry bags
	Teabags, misc. nonwoven packaging (soaker pads, envelopes, etc)
	Twine (non-baler)
	Netting, other woven strapping, etc
Protech	Dust protection/clean room fabrics, asbestos protection fabrics, face masks
	Durable and disposable chemical protection, NBC fabrics
	Heat, fire resistant fabrics
	Anti-ballistic, cut/slash protection fabrics
	Foul weather clothing, hi-visibility fabrics Safety straps/harnesses (excl car seat belts)
Sporttech	Sports bags/straps, textile shopping bags, substrates for leathergoods
	Sports nets, foot balls, ropes, artificial turf, equipment composites, sports ropes, sail cloth, air-sport fabrics, animal webbing
	Tents, sleeping bag fabrics, sleeping bag fillings
	Flags, bookcloth, boat covers
Oekotech	<i>Products included in the list above that are used for environmental protection applications: housewrap (Buildtech), erosion control, pit linings (Geotextiles), woven filters, NW dust filters (Indutech), insulation (Mobiltech)</i>
Total 12	Total ca. 150

Source: DRA

Exhibit A2.2

Full List of Variables and their Subsets in the Technical Textiles Partition of DRA's Textile Products End-Use Consumption Forecasting System

Regions/Countries		Polymer/Fibre Types		Polymer/Fibre Forms (Yarn Type)		Fabrics & other Final Textile Products (Fabric Type)		Coatings	
Summary Level	Full List	Summary Level	Full List	Summary Level	Full List	Summary Level	Full List	Summary Level	Full List
N America	Canada, USA	Natural	Cotton Wool Others Wood-pulp	Polymer chip	Polymer chip	Unspun fibre	Unspun fibre	Coated	PVC PU Rubber Other
S America	Mexico, Brazil, other Central, South America			Staple fibre	Staple fibre				
W Europe	Countries of EU, EFTA, etc	Regenerated	Viscose Other cellulosic fibres	Spun staple yarn	Spun staple yarn	Woven fabrics	Broadwoven fabric Narrow-woven fabric Circular-woven fabric	Uncoated	Uncoated
E Europe	Central/Eastern Europe, incl. CIS, Baltic states			Multifilament yarn	Textile (regular tenacity) Industrial (high tenacity) BCF				
S Asia	India, Pakistan, Sub-continent.	Synthetic	Polyester Polyamide Polypropylene Polyethylene Acrylic Elastomeric p-aramid m-aramid Other synthetic high performance	Monofilament yarn	Monofilament yarn	Nonwoven fabrics	Dry-laid nonwovens Air-laid nonwovens Wet-laid nonwovens Extruded nonwovens	Other fabrics	Tufted fabrics Knotted nets
N E Asia	Japan, China, Hong Kong, Korea, Taiwan, Macau.			Tape and slit film yarn	Tape and slit film yarn				
S E Asia	Philippines, Thailand, Malaysia, other ASEAN	Inorganic	Glass Carbon Ceramic Steel						
Rest of World	Including Middle East (Turkey, Egypt, countries of Middle East), Africa (all African countries), Central Asia (Asian Republics, other ex-USSR) and Oceania (Australasia, South Pacific islands).								
8	210	4	19	6	8	6	19	2	5

Source: DRA