Electronic traceability: feasibility

Pressure to keep building costs down provides an incentive to source cheaper alternative materials, but the cheaper products may not be fit for purpose. An electronic traceability system would help reduce the use of these non-conforming products.

Traceability schemes are used worldwide for products from food to minerals to give customers confidence that they are buying what they think they are buying.

With a traceability system, manufacturers add a unique machine-readable identifier (such as a barcode or radio frequency ID tag) to each product. These identifiers are stored in an online database called the National Product Catalogue (NPC).

Anyone who scans the identifier could then find information such as:

- confirmation of who the manufacturer is and where the product was manufactured
- what testing and conformity assessment has been undertaken and by whom to demonstrate compliance with the New Zealand Building Code
- other product-related attributes, such as constituents, whether a product stewardship scheme exists and supporting environmental details (for example, hazardous substance classifications, environmental product declarations).

Such a system would also enable identification of where specific products are used on construction projects nationally.

Why a traceability system?

For most building projects, the building consent application documents specify the products to be used. For many reasons, however, non-specified products are sometimes substituted on site. These can include products that do not comply with the Building Code and relevant standards, are not fit for purpose or come with fraudulent documentation.

There is growing evidence in New Zealand and worldwide that non-conforming products are a real problem. Undetected, they may present a health and safety risk to building users and reduce building durability. Where detected after installation, they may require expensive rework.

BRANZ carried out a feasibility study into the potential for an electronic traceability system for construction products in New Zealand as a means to help reduce use of non-conforming products. The model system was based on an expanded version of the already-existing NPC (see the diagram over the page). Many

builders' merchants already use the NPC for products in stock and purchasing. Potential costs and benefits of the traceability model were assessed.

Under the system, specified products and suitable alternatives would be listed with their machine-readable identifiers in the building consent documents provided to the building consent authority (BCA). A builder would also make this list available to builders' merchants when ordering materials. On site, products could be scanned on delivery using a smartphone app to check that they are the ones listed on the specification held by the BCA.

Costs and benefits of a traceability system

The costs of implementing electronic traceability can be offset against the existing direct costs of fixing non-conforming products. These direct costs have been estimated at $95 million per year (residential only) and $232 million per year (residential and commercial). Costs on top of this include redesign, extra council fees, reputation loss and business disruption. In some cases, these may be as large as or exceed reconstruction cost. There is also the potential for injury and loss of life.

If electronic traceability reduces non-conforming product use by just 6%, that is a saving of at least $5.7 million a year, covering the expected annual cost of the traceability scheme.

A 30% reduction in non-conforming product use gives an estimated net return of $23 million each year – the savings would far outweigh the costs.

Other benefits include:

- fewer accidents and injuries from product failure
- lower risk of business loss from product failure and claims against implied warranties and remedies
- potential for faster design and consenting through a product database easily accessed by designers and BCAs
- builder confidence that the products they use are acceptable and as specified
- reduced risk to manufacturer reputation when a consumer believes that a failed non-conforming product is the genuine product
- a new path for manufacturers to meet consumer demands for responsible sourcing
- greater consumer confidence in the regulatory system
- BCAs, government and researchers can see real-time data on product use.
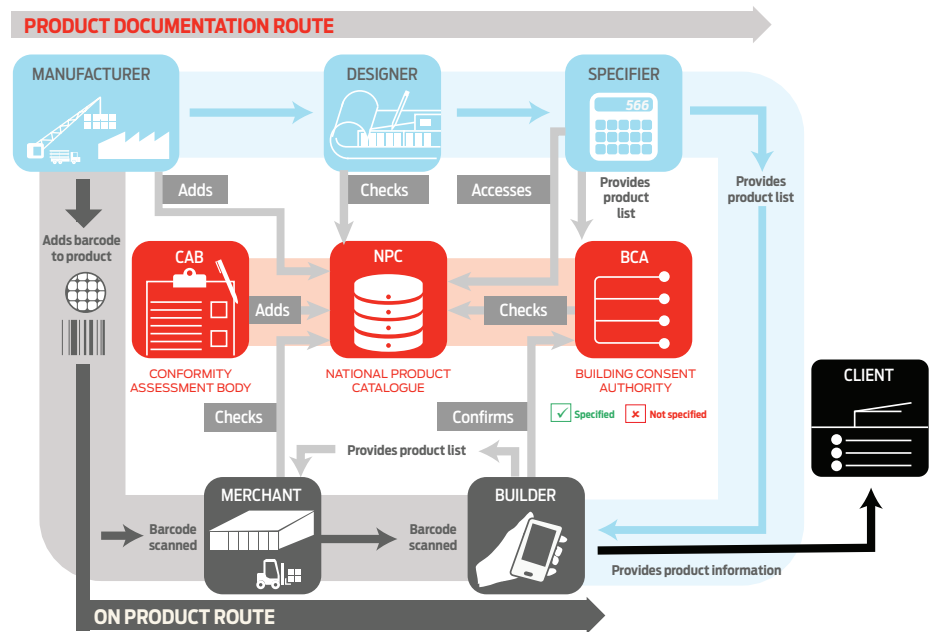
Electronic traceability has promise

The BRANZ research shows that an electronic traceability system looks feasible and cost-effective as a way of reducing non-conforming product use. One potential part of a system, the National Product Catalogue, already exists.

BRANZ surveyed stakeholders about their views. Although the response rate was not high (11%), 370 stakeholders gave their views. More than 80% thought a traceability system was needed.

Industry, central and local government will need to work together to scope how a system would operate, which products should be included and what information is required. Ultimately, a pilot scheme could be developed.

Model Electronic Traceability System

MANUFACTURER	Adds machine-readable identifier to product (e.g. linear/2D barcode). Develops product documentation (such as product technical statements, BIM objects) and adds product information to NPC.
MERCHANT	Scans product in and out. Creates order from product list sent by builder. Scans product to check it is on NPC and is as specified. Provides quantity information.
BUILDER	Provides merchant with product list for ordering. Scans product on receipt to check against BCA electronic product list and confirms intent to use on build. Confirms product is as specified.
DESIGNER	Can check if proposed product is listed on NPC. Can check product information on NPC (e.g. conformity assessment). May check other information (e.g. constituents, provenance if available).
SPECIFIER	Creates product list of acceptable products and alternatives with machine-readable identifiers accessed from NPC. Provides product list to builder and BCA as part of consent documentation.
CAB	Adds machine-readable identifier to conformity assessment information (tests, opinions, certification). Adds link to conformity assessment information to NPC for tested product.
BCA	Holds product list electronically. Can check if proposed product is on NPC. Can check conformity assessment and other information about proposed product. When product scanned by builder on site and checked to product list, any gaps provide the basis for greater scrutiny during site inspections.
NPC	Database of products with identification in a machine-readable form. Contains fields for other information (e.g. conformity assessment).
CLIENT	Potential to obtain product list with confirmation of products that went into the build. Opportunity to link to useful information (e.g. maintenance requirements).