Active and Passive Voice in Technical Documents: When is it Okay to Use Active Voice?

Instructors teaching EPD 397 tend to emphasize active voice because it can be more concise and clear than passive voice. However, we advocate that engineers should be comfortable writing paragraphs that employ both passive and active voice, and they should know that passive and active can be used interchangeably within the same paragraph. Students must make wise choices about what material can be put in passive: they should use passive when the agent of the sentence is obvious, or when the agent doing the work is clearly implied by the surrounding context; they should use active when it would be helpful, more efficient, and more powerful to clearly state who or what is doing the action.

Students need to take care not to become confused about the difference between passive voice and *third person*: we can write in third person (avoiding "I," "we," or "you") while still writing *in active voice*: "The project demonstrates X" is such an example. Maybe the difficulty all along for students has simply been the awkwardness of always employing the third person in their lab reports. I know some engineering faculty who allow "I" or "we," (and I encourage the use of these words in more personal and more informal documents in EPD 397). But many readers find those words inappropriate for formal technical documents. The lack of a consistent approach among professors must be very confusing to students, but students should recognize that this is a reason to study the audience of a document carefully: if the document is being written for a journal, look at the other documents published in that journal. Do other writers use first person, or are all the articles in third person? If the document is being written for another professor, talk to that prof about what he or she wants.

Even if your audience requests that you use *third person (no "I" or "we")* in your formal technical documents, your style should still show a use of active as well as passive voice. Often, that variety makes a more fluid and clear document. I think students should ask faculty if the occasional use of "I" or "we" is permissible, especially for places in a document where goals, conclusions, and recommendations are being discussed. When a writer's goals or judgments are being described, such structures will often make the document easier to understand.

To see how our own engineering faculty use active and passive voice, I looked up some publications by various UW CoE professors. I found that it is fairly common for our faculty to use passive and active voice interchangeably within a paragraph, as the excerpts below demonstrate. However, some of those writing for journal articles did cast their articles almost exclusively *in third person*, even when active voice was being used. Thus, the answer to the question in the title above is this: it is acceptable to use active voice in technical documents, and our own faculty use it often. I think the real question on the minds of many students is "when is it okay to use "I" or "we"? The answer to that question really depends on the audience.

As you can see below, Professor Crone's writing demonstrates a judicious use of both passive and active voice. Her writing demonstrates that the occasional sentence in active voice can enliven the writing and provide a relief to the reader who might be wondering "who or what is doing this action?" Professor Crone doesn't use "I" or "we" in the document excerpted below.

The text in yellow is in passive voice; the text in light blue is in active voice.

Bulk Shape Memory NiTi with Refined Grain Size Synthesized by Mechanical Alloying

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Introduction

During repeated plastic deformation as in ball milling or cold rolling, a concomitant refinement of grain size is observed. Recently, a new variation of the strategy has been developed which can yield nanocrystalline product structures [1-3]. By starting with a stacked sandwich array of elemental material and subjecting this sample arrangement to repeated rolling and folding, the resulting layers may be readily reduced to the nanometer size scale in bulk form before initiating an alloying and intermediate phase formation reaction [1-4]. One goal of the current research is to assess the suitability of a multilayer cold rolling effort for the preparation of Ni-Ti laminate composites with nanoscale layer thickness. If alloys with suitably refined layered thickness can be produced with this method, the composite material can be further processed to produce an alloyed material with refined grain structure. Similar preparation methods have been employed on elemental foils [5] and composite powders [6] of nickel and titanium, but the compositions investigated were well away from equiatomic NiTi and thus these materials did not display shape memory behavior.

Shape memory alloys constitute a unique class of materials that have already proven to have wide ranging applications in industries ranging from aerospace to biomedical. These materials have a crystallographic structure that can change reversibly and reproducibly, allowing the material to display dramatic stress-induced and temperature-induced recoverable deformations. The behavior of NiTi SMA is governed by a phase transformation between austenite and martensite crystal structures. Transformation between the austenite (B2) and martensite (B19') phases can be produced by temperature cycling between the high temperature austenite phase and the low temperature martensite phase (shape memory effect), or loading the material to favor the high strain martensite phase or unloading to favor the low strain austenite phase (superelasticity).

Another complimentary goal of the research reported here is to explore the impact of small grain size on shape memory properties in NiTi. Various researchers have correlated the reduction in grain size in SMAs to changes and improvements in the shape memory behavior of the material. Smaller grain size have been shown to increase the fatigue life, increase the superelastic and superplastic behavior at high temperatures, and improve workability in Cu-based alloys such as CuZnAl and CuAlNi [7-9]. In NiTi alloys, correlation between the grain size and such factors as the transformation temperatures, transformation stress, transformation modulus, and hysteresis stress has also been observed experimentally [10-11]. The cold rolling fabrication technique described here allows exploration of the effect of highly reduced grain size on the mechanical properties of NiTi SMA.

The example below comes from our colleagues in Civil Engineering. Here again, as in Professor Crone's writing, the third person is used exclusively, but passive and active structures are used throughout the passage interchangeably.

A model specification for FRP composites for civil engineering structures
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1. Introduction
It is widely recognized that in order for fiber reinforced polymer (FRP) composite materials to be used in the construction of civil engineering structures such as buildings and bridges a uniform procedure for speci-fying these materials is required. Standard specifications exist for all commonly used materials in the civil engineering construction. These specifications ensure that materials used in civil engineering projects are defined in specific classes, are tested using standard procedures, are certified in a uniform format and provide specific properties for their intended use. A consensus-based general material specification for FRP materials for use in civil engineering structural applications does not exist at this time. A model specification has been developed by the authors, under sponsorship of the US Federal Highway Administration (FHWA) and in coor- dination with the American Association of State Transportation and Highway Officials (AASHTO). The specification has not yet been approved by either AASHTO or the America Society for Testing and Materials (ASTM). This article describes the development of the model FRP material specification and the key elements that the specification contains. The Appendix to this article contains the model specification itself. The specification is titled 'Standard Specification for Fiber Rein- forced Polymer (FRP) Composite Materials for Highway Bridge Applications' as per the requirements of the contract under which it was developed.

From a detailed review of codes and specifications for composite materials a number of key sources were identified as a basis for the development of the model FRP material specification for civil engineering appli- cations. These documents, detailed below, provide procedures for material characterization, methods for prediction of long-term properties and performance, and acceptance criteria. The American National Standard for Ladders w1x, the specification for reinforced plastic ladders, provides detailed procedures for testing and minimum properties for acceptance of FRP materials for use in ladders. Tests for physical properties (e.g. density, maximum water absorption and cure) and mechanical properties subjected to dry, wet, elevated temperature and weathered conditions are stipulated. The International Conference of Building Officials (ICBO) Acceptance Criteria AC-125 w2x specifies selected physical and mechanical properties to be measured and reported for composite materials used for repair and retrofit of concrete structures. While no minimum properties are specified for use, limits on minimum property retention values following conditioning for 1000 and 3000 h are stipulated. The US Department of Defense Military Handbook 17 w3x provides procedures for obtaining properties for design for FRP composites for aerospace applications, as well as property data for specific composite material systems. Finally, specifications of the American Society of Testing and Materials (ASTM) related to 'fiberglass' tanks, pipes and poles (e.g. ASTM D2997, D3754, D4021 and D4923) provide guidance on test methods, acceptance criteria and methods for prediction of long-term properties of FRP composites w4x. Key sections of the specification are discussed in the text that follows. The order of the discussion follows that of the specification, which is organized and pre- sented in the generally-accepted format provided by ASTM w5x: scope, classification, materials, manufacturing, qualification testing, acceptance testing, reporting and quality assurance. Sections on terminology, ordering information, keywords and product marking are contained in the specification but are not discussed in the article. References to tables, figures and text sections that are numbered with the decimal point (e.g. Section 9.5.2) refer to elements of the specification and not to the article itself.

A final technical report that uses active voice AND first person

Please see the handout of Eric Hellstrom's final report "Optimization of Jc in BSCCO Tapes" written for the Office of Naval Research (2/23/2002)

Also found at:
http://stinet.dtic.mil/cgi-bin/GetTRDoc?AD=ADA400302&Location=U2&doc=GetTRDoc.pdf

Notice that in Professor Hellstrom's document, the abstract is written in passive voice, but the document itself is absolutely peppered with active voice -- **and *the use of first person plural, "we," to emphasize who did the work***. Professor Hellstrom, who while he was on faculty here was a champion of clear writing, demanded that his students use active voice and first person. Professor Hellstrom's work here is a final report on work done, not a journal article, and he likely is aware from previous interactions with this funding agency that they find first person active voice acceptable.